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BEFORE THE COURT is Defendant Mitsubishi Heavy Industries' ("Mitsubishi") lawsuit alleging that General Electric Company ("GE") committed inequitable conduct during the '705 patent application. Having reviewed the evidence, the Court finds that the alleged prior art and prior uses are material, but there is not clear and convincing evidence that GE employees deliberately withheld it from the Patent and Trade Office (PTO) in order to obtain a broader patent. In short, GE did not commit inequitable conduct.

### **I. Background**

GE filed this lawsuit against Mitsubishi in February 2010 alleging that Mitsubishi's 2.4MW wind turbines infringe GE's '705 Patent and another GE patent, U.S. Patent No. 6,879,055.4. (Dkt. No. 1). Mitsubishi asserted affirmative defenses of inequitable conduct to GE's infringement claims under both patents. (Dkt. No. 549). After the parties agreed to bifurcate Mitsubishi's inequitable-conduct claims for a separate bench trial proceeding, GE's infringement claims and Mitsubishi's invalidity defenses were tried to a jury in late February and

early March 2012. On March 9, the jury returned a verdict that Mitsubishi infringes claim 1 of the '705 Patent, and awarded GE \$166,750,000 in lost profits and \$3,445,000 in reasonable-royalty damages. (Dkt. No. 536). The jury also found that claim 1 was not anticipated by Nielsen '936 and was not ready for patenting before October 20, 2005. *Id.*

After the jury verdict, Mitsubishi moved for judgment as a matter of law on invalidity and non-infringement, and that lost profits is not the appropriate measure of damages. (Dkt. No. 588). Mitsubishi also requested a new trial on all three issues, or, in the alternative, remittitur of the damages award. (Dkt. No. 591). GE moved, subject to the outcome of the inequitable-conduct proceedings, for entry of judgment on the jury's verdict and a permanent injunction. (Dkt. No. 561). The Court denied Mitsubishi's motions for judgment as a matter of law and a new trial on July 9, 2012. (Dkt. No. 640). Subject to the outcome of the inequitable conduct proceedings, the Court granted GE's motion for entry of judgment and for permanent injunction on July 9, 2012, and denied Mitsubishi's request that the injunction be stayed pending appeal. (Dkt. No. 640).

Prior to the inequitable-conduct phase of the proceedings, the Court ordered Mitsubishi to identify, from among the twenty-four individuals at GE accused of withholding twenty-eight separate items of prior art in Mitsubishi's pleadings and interrogatory responses, the specific prior-art references and the individuals alleged to have withheld those references. (Dkt. No. 653). On August 29, 2012, Mitsubishi identified Erdman '083, Wobben '941 and the Hartge presentation, Nielsen '936 and the Bolik and Saylor presentations, Feddersen '789, the E.ON 2003 grid code, and the installation of GE's 1.5MW wind turbines at Colorado Green, Sweetwater, Taiban Mesa, and Cowboy Wind as the prior art on which it would base its inequitable conduct claims at trial. (Dkt. No. 669 at 12-13). Mitsubishi identified Dr. James

Lyons, James McGinness, Robert Delmerico, Scott Frame, Nicholas Miller, and Einar Larsen as the individuals at GE who it claims withheld one or more pieces of material prior art during the preparation or prosecution of the '705 Patent. *Id.*

On September 25, 2012, just prior to the inequitable conduct trial, the Patent Office issued an Action Closing Prosecution ("ACP") in the *inter partes* reexamination of certain claims of the '705 Patent that Mitsubishi initiated in 2011. DTX-2785. The ACP rejected claims 1 and 7 as anticipated by Erdman '083 and Wobben '941. In doing so, however, the examiner agreed with GE that zero voltage ride through is fundamentally different from low voltage ride through, and that the E.ON 2003 grid code does not invalidate any claim of the '705 Patent because it merely identifies the ride-through requirements that manufacturers must meet without describing any technical solutions for doing so. DTX-2785 at 36. With respect to Erdman and Wobben, the examiner found those references invalidating because, in the examiner's view, they teach riding through to "approximately zero volts" by riding through voltage dips down to 5% and 30% of nominal voltage measured at the turbine, respectively. DTX-2785 at 20, 35.

In Right of Appeal Notice ("RAN") issued on May 7, 2013, the PTO again rejected Claims 1 and 7 of the '705 patent on the basis of prior art. Yet within that same ruling, the PTO reversed its prior rulings, and held that Erdman, Wobben were *not* material prior art and *do not* anticipate claims 1 and 7 of the '705 Patent. The PTO also reversed itself on Nielsen, finding it is not material to claim 7. The PTO's latest ruling about Nielsen regarding claim 1 is forthcoming and has not yet been released. The PTO's RAN decision came after an *ex parte* meeting with GE representatives on December 20, 2012. Five GE employees, including Jim McGinness and Einar Larsen, delivered a 37-page PowerPoint presentation to PTO examiner Robert Nasser. The examiner had the benefit of the transcript from the inequitable conduct trial, which included

cross-examination of both parties' experts, though it is not clear to what extent it was used. The parties tried Mitsubishi's inequitable conduct claims to the Court beginning on October 3, 2012. The bench trial lasted five days, and concluded on October 11, 2012.

## II. Policy Underlying The Inequitable Conduct Doctrine

The inequitable conduct doctrine stems from the duty of candor that patent applicants owe to the PTO. *See Precision Instrument Mfg. Co. v. Auto. Maintenance Mach. Co.*, 324 U.S. 806, 816 (1945). Applicants have an "uncompromising" duty of candor and good faith in dealing with the PTO, which includes the duty of disclosing all known material prior art. *Id.* at 818; *see also* 37 C.F.R. § 1.56(a). "Public interest demands that all facts relevant to such matters be submitted formally or informally to the Patent Office, which can then pass upon the sufficiency of the evidence. Only in this way can that agency act to safeguard the public in the first instance against fraudulent patent monopolies." *Precision*, 324 U.S. at 817. The single PTO examiner cannot possibly find every fact regarding patentability every industry and thus, must necessarily rely on the good faith and candor of patent applicants. *See Kingsland v. Dorsey*, 338 U.S. 318, 319 (1949).

Recognizing that compliance with the duty of candor is often contrary to the applicant's self-interest – *i.e.*, it requires patent applicants to disclose information that may adversely impact entitlement to the claims – the United States Supreme Court created the doctrine of inequitable conduct to police that duty and ensure the patent system's integrity. *See Precision*, 324 U.S. at 816. The doctrine is designed to prevent applicants from knowingly misleading the patent office on patentability matters and ensure that examiners have full access to favorable and unfavorable information, despite the *ex parte* nature of the proceedings. The penalties for breaching the duty

of candor are severe. Where inequitable conduct has occurred with respect to any claim, the entire patent becomes unenforceable. *Therasense, Inc. v. Becton, Dickinson & Co.*, 649 F.3d 1276, 1288 (Fed Cir. 2011) (*en banc*).

This Court understands the extreme consequences of finding inequitable conduct, and why the Federal Circuit so strongly disfavors it. Stripping inventors of their patent rights amounts to the “nuclear option”, and should only be exercised with clear and convincing evidence. *See Therasense* 649 F.3d at 1288. Furthermore, while inventors have a duty of candor when applying for a patent, it is possible to innocently omit relevant prior art, either by accident or because of a good faith belief that the art in question was not material. The Federal Circuit has sought to limit the use of inequitable conduct in courts, viewing it as a scourge on the patent bar. As a policy matter, the Federal Circuit’s limitations make sense. Inventors should not have their patent rights stripped away merely because they fail to include every possible piece of prior art, as such a policy would encourage competitors to infringe on patents and then attempt to invalidate them via inequitable conduct. Instead, there must be clear and convincing evidence that the inventors knew the prior art was material and deliberately failed to disclose it, violating the duty of candor. A limited inequitable conduct doctrine should prevent the intentional deception of the Patent Office, not merely punish harmless oversights or legitimate disagreements over the relevance of prior art.

If a court finds the alleged prior art is material, it then must decide whether the decision to withhold the art was a deliberate event to deceive the PTO. “[I]n order to show that the patentee acted with the specific intent to deceive the PTO, a defendant must prove ‘that the applicant knew of the reference, knew that it was material, and made a deliberate decision to withhold it.’” *1st Media, LLC v. Elec. Arts, Inc.*, 694 F.3d 1367, 1372 (quoting *Therasense*, 649

F.3d at 1290). “Knowledge of the reference and knowledge of materiality are insufficient after *Therasense* to show an intent to deceive.” *Id.* at 1374. Furthermore, “proving that the applicant knew of a reference, should have known of its materiality, and decided not to submit it to the PTO does not prove specific intent to deceive.” *Therasense*, 649 F.3d at 1290. “A finding that the misrepresentation or omission amounts to gross negligence or negligence under a ‘should have known’ standard does not satisfy this intent requirement.” *1<sup>st</sup> Media*, 694 F.3d at 1374. “To meet the clear and convincing standard, the specific intent to deceive must be ‘the single most reasonable inference able to be drawn from the evidence.’” *Therasense*, 649 F.3d at 1290 (quoting *Star Scientific Inc. v. R.J. Reynolds Tobacco Co.*, 537 F.3d 1357, 1366 (Fed. Cir. 2008)). “[W]hen there are multiple reasonable inferences that may be drawn, intent to deceive cannot be found.” *Therasense*, 649 F.3d at 1290-91. “A court can no longer infer intent to deceive from non-disclosure of a reference solely because that reference was known and material. Moreover, a patentee need not offer any good faith explanation for his conduct unless and until an accused infringer has met his burden to prove an intent to deceive by clear and convincing evidence.” *1st Media*, 694 F.3d at 1372-73. The Court understands the intent of the Federal Circuit in designing so many roadblocks to a finding of inequitable conduct: only “slam dunk” cases should be considered. Nevertheless, the Federal Circuit cannot have intended to entirely eliminate the duty of candor.

This is particularly thorny, because “direct proof” of deception would most likely come in two forms: First, a whistleblower who testifies that the inventors acted in bad faith. This, while possible, would certainly require extraordinary circumstances. Second, a “smoking gun” document that amounts to a transcription of a conspiracy to deceive the PTO. This too is particularly unlikely, not only because such written confessionals are rare, but more importantly

because those documents would be unlikely to emerge in an inequitable conduct trial due to attorney-client privilege. Since the attorney filing the patent would be included in most, or all relevant discussions about the prior art, those documents would not be discoverable by the opposing party. As a result, inequitable conduct is a defense that has been commonly plead, but rarely proven. In response to this “plague” of pleading inequitable conduct “on the slenderest grounds” the Federal Circuit in *Therasense* “tighten[ed] the standards for finding intent and materiality in order to redirect a doctrine that has been overused to the detriment of the public.” *Therasense*, 649 F.3d at 1289-90 (Fed. Cir. 2011).

After the production of over ten million pages of documents, over thirty depositions of GE employees and attorneys, in-camera review of GE’s entire privilege log, a jury trial on infringement and validity, and a bench trial, no single “smoking gun” document emerged. As a result, the Court is obliged to rule in favor of GE, despite the evidence of materiality of the prior art and GE’s possible awareness of it.

### **III. Standard for Finding Inequitable Conduct**

In order to prevail on an inequitable conduct claim, a defendant must establish both the materiality of the withheld reference and the applicant's intent to deceive the PTO. *Therasense, Inc. v. Becton, Dickinson and Co.*, 649 F.3d 1276, 1290 Fed.Cir.2011) (en banc). In *Therasense*, the Federal Circuit rejected the “sliding scale” approach to proving inequitable conduct, “where a weak showing of intent may be found sufficient based on a strong showing of materiality, and vice versa.” *Id.* Instead, “[i]ntent and materiality are separate requirements.” *Id.* Moreover, a district court may not infer intent solely from materiality, and thus “[p]roving that the applicant knew of a reference, should have known of its materiality, and decided not to submit it to the PTO does not prove specific intent to deceive.” *Id.*



With respect to materiality, the standard is “but-for” materiality unless there is affirmative egregious misconduct (which is not alleged here). *Id.* at 1291–92. A prior art reference “is but-for material if the PTO would not have allowed a claim had it been aware of the undisclosed prior art.” *Id.* at 1291. In the inequitable conduct context, but-for materiality must be shown by a preponderance of the evidence, “giv[ing] claims their broadest reasonable construction.” *Id.* at 1291–92; *see also Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1334 (Fed. Cir. 2012). “Often the patentability of a claim will be congruent with the validity determination—if a claim is properly invalidated in district court based on the deliberately withheld reference, then that reference is necessarily material because a finding of invalidity in a district court requires clear and convincing evidence, a higher evidentiary burden than that used in prosecution at the PTO.” *Therasense*, 649 F.3d at 1292.

To satisfy the intent requirement, “the accused infringer must prove by clear and convincing evidence that the applicant knew of the reference, knew that it was material, and made a deliberate decision to withhold it.” *Id.* at 1290; *1st Media*, 694 F.3d at 1374–75 (Fed. Cir. 2012) (“Knowledge of the reference and knowledge of materiality alone are insufficient after *Therasense* to show an intent to deceive .... To sustain a charge of inequitable conduct, ‘clear and convincing evidence must show that the applicant made a deliberate decision to withhold a known material reference.’”). Thus, inequitable conduct requires clear and convincing evidence of a specific intent to deceive the PTO. *Therasense*, 649 F.3d at 1290.

#### **IV. Summary of the Court’s Findings**

In short, the Court finds that GE did not commit inequitable conduct when filing the 705 patent. This finding is made with some reluctance, as the Court finds the prior art *is* material—a

fact which GE may have considered—but there is insufficient evidence to *conclusively* prove that GE deliberately deceived the PTO. Such a strained holding is the result of this Court’s obligation to enforce the Federal Circuit’s nearly insurmountable standards for deliberateness outlined in *Therasense* and *1<sup>st</sup> Media*. While those rulings will certainly reduce frivolous charges of inequitable conduct, in the process, they have severely limited the ability of district court judges to make inferences based on the evidence.

Currently, a patent applicant can know the art is material, not present it to the PTO, and *still* avoid a charge of inequitable conduct. *See 1st Media*, 694 F.3d at 1376-77 (“As *Therasense* made clear, a defendant must prove that an applicant (1) ‘knew of the reference,’ (2) ‘knew it was material,’ and (3) ‘made a *deliberate decision* to withhold it.’”) This third requirement of “deliberateness” creates a hurdle is unlikely to be jumped in all but the rarest cases. Here, GE submitted *just one* piece of prior art, omitting entire state of the wind industry at the time. As a result, the claims of the ‘705 patent are expansive: they effectively mean that any wind turbine manufacturer (using a software solution) who complies with the zero voltage ride through requirements of U.S. grid codes will be in violation of the ‘705. By omitting *the entire state* of the U.S. wind industry, GE led the Patent Office to believe that its invention was the first to successfully ride through zero voltage events; yet there is insufficient proof this was a deliberate effort to deceive.

This case was also plagued by a lack of documentation due to the attorney-privilege. This is particularly unfortunate because it obscured the Court’s ability to fully judge the record. Additionally, there is policy concern: by ensuring that a lawyer is always involved in the key discussions during the application process, which is normally the rule, sophisticated patent applicants can assert privilege over a wide range of documents. Because courts must respect

privilege, any “smoking gun” documents, if they exist, are unlikely to ever emerge. Just such a scenario unfolded here, as the Court was unable to see the full scope of GE’s thought process during the application process. Nevertheless, the Court’s hands are tied by the Federal Circuit’s post-*Therasense* precedent, and without more conclusive documentation of a deliberate conspiracy, there can be no finding of inequitable conduct.

First, the Court finds that the alleged prior art was indeed “but for” material and, had the PTO been alerted, it would have prevented the issuance of claims 1 and 7 of the ‘705 patent. Second, Mitsubishi did *not* present clear and convincing evidence that key GE players who filed the ‘705 Patent deliberately deceived the PTO. While the record shows that the GE players analyzed and considered the materiality of the prior art patented by their main competitors in the wind industry, there is no proof that GE considered it material to the ‘705 patent and then withheld it. That said, the key GE players did not merely fail to disclose one patent, or even two; instead, they failed to disclose *all* of the relevant wind turbines dominating the market at the time. Additionally, the evidentiary record shows that the *lone patent* disclosed by GE — Janssen ‘188, a GE patent from January 2003 — was far more rudimentary than the other, more technologically-advanced competitor patents.

This Court’s decision to contradict the most recent PTO ruling on materiality may raise eyebrows. If the Court is supposed to find materiality based on what the PTO would have done, how can it know better than the PTO? The Federal Circuit in *Therasense* was adamant that, in determining materiality for purposes of inequitable conduct, the district court must determine “whether the PTO would have allowed the claim if it had been aware of the undisclosed reference.” 649 F.3d at 1291. And as mentioned, on reexamination, the PTO has found that Erdman and Wobben *do not* require the rejection of claims 1 and 7 of the ‘705 patent, nor does

Nielsen require the rejection of Claim 1. *See* Right of Appeal Notice. Yet at most, this ruling is *persuasive* and not conclusive or definitive. Previously, the PTO had found that Erdman, Wobben, and Nielsen each *independently* required rejection of Claims 1 and 7. Thus, if the Court had ruled at any time before the recent Right of Appeal Notice in May, it would have been persuaded by a PTO to find the prior art material. Additionally, this most recent RAN is still eligible for further appeals, meaning the PTO may again change course. Lastly, the PTO has *still* maintained the position that claims 1 and 7 are rejected, albeit on the basis of prior art not included in this trial (Wall).

Thus, the Court is supposed to be persuaded by current, still ongoing PTO rulings on the prior art in this case, while ignoring the fact that key claims from the infringement trial's \$170 million judgment, are still currently rejected. Under the circumstances, the Court finds this case in a strained posture. The parallel proceedings before the PTO have not yet been completed, and have taken a particularly different path from this Court as it renders its own conclusion. While the PTO's current judgments are persuasive, this Court believes the prior rulings at the PTO were a more accurate view of the prior art, and the disagreements within the PTO itself reflect just how delicate these matters are. The reversal at the PTO also shows that the materiality of the prior art could have eluded the key GE players. Again, while the Court disagrees with the findings of the current RAN, they are persuasive to the degree that they show persons skilled in the art could have taken the view that Erdman, Wobben and Nielsen were not material.

Ultimately, the Court's disagreement with the PTO's current stance exposes a fundamental disconnect in the parallel proceedings. While the PTO examiner Robert Nasser had the trial record in front of him, he did not witness it with the same detail as the Court. That is, this Court must not only view all of the evidence before it, it must also gauge the persuasiveness

of the PTO's ruling in that light. Furthermore, Mitsubishi raised the issue of *prior uses* before this Court, namely the GEIS converters, which it could not raise before the PTO because it was not *prior art*. This adds yet another layer of nuance to the Court's finding of materiality. While the Court respects examiner Nasser's decision, it does not explain why impedances on the grid side of the transformer, which are typically at least 5-10%, would not allow the alleged prior art to achieve a less robust ZVRT, and therefore be material. Even after *Therasense*, the test for materiality is broad. In evaluating whether an undisclosed reference is but-for material, courts are instructed to "give claims their broadest reasonable construction." *Therasense*, 649 F.3d at 1292. This is in keeping with the broad sweep of the duty of candor and the basic precept that "[c]lose cases should be resolved by disclosure, not unilaterally by [the] applicant." *Critikon, Inc. v. Becton Dickinson Vascular Access, Inc.*, 120 F.3d 1253, 1257 (Fed. Cir. 1997) (*quoting LaBounty Mfg., Inc. v. U.S. Int'l Trade Comm'n*, 958 F.2d 1066, 1076 (Fed. Cir. 1992)). The patent applicant cannot independently decide that the patented technology does not work: "In patent prosecution the examiner is entitled to reject application claims as anticipated by a prior art patent without conducting an inquiry into whether or not that patent is enabled. . . ." *In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012) (internal quotations and citations omitted). *See also Novo Nordisk Pharmaceuticals, Inc. v. Bio-Technology General Corp.*, 424 F.3d 1347 (Fed. Cir. Del. 2005); *Manual of Patent Examining Procedure* § 2121 (8th ed. 2001, rev. 2006). When applying for a patent, the individual may not omit prior art simply because he suspects it does not work. Lastly, proof of "but-for" materiality in the inequitable conduct context requires only a preponderance of the evidence. *Therasense*, 649 F.3d at 1291-92. It need only be more likely than not that the PTO would have reached a different result. Here, at least seven prior art references that were not disclosed in the '705 patent application.

The lone disclosed reference, Janssen '188, describes wind turbine ride-through at voltage levels of 15%, and never claims the ability to remain connected through any zero voltage or "three phase fault" events. In other words, it is *pure* "low-voltage ride-through" system; when there is a zero voltage event anywhere, including the point of interconnection, the turbine will disconnect. This is contrasted with the more updated competitor patents and prior art which *can* remain connected during zero-voltage events further down the grid. These systems require 5% voltage to remain connected. This *allows them to ride through zero voltage events* at the point of interconnection, because residual voltage in the system and turbine, measured at the padmount transformer, is usually between 5-10% during the tenths of a millisecond that the voltage drops to zero. By omitting the advances made after Janssen, GE gave the Patent Office the impression that they were the first in the industry to achieve zero voltage ride through. This likely allowed GE to gain a broader patent.

Privilege issues also plagued the testimony from GE employees. This was particularly true with the GE attorney Jim McGinness, who testified that he acted in good faith and insisted that to the extent that he knew about the relevance of prior art, he would disclose it. Yet he also enjoyed the benefit of the attorney-client privilege which allowed him to avoid any documentary reference to what GE knew about prior art in the wind industry and its potential relevance to the '705 patent. While the Court ruled against finding a waiver of privilege (Dkt. No. 760), it also stated that McGinness' strategy of hiding behind privilege while asserting his good faith would be viewed critically. Nonetheless, the Court's latitude is limited by the Federal Circuit, which has held that assertion of attorney-client and/or work-product privilege and the withholding of the advice of counsel shall no longer entail an adverse inference as to the nature of the advice. *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337, 1345 (Fed.

Cir. 2004). By not allowing the Court to draw a *negative* inference from GE's extensive use of privilege, the Federal Circuit essentially forces the Court to make a *positive* inference. This produces a tremendous structural advantage for the party accused of inequitable conduct, while encouraging the abuse of privilege. Additionally, GE's assertion of privilege sometimes left gaping holes in some witnesses' explanations of the evidentiary record.

These key problems worked together to limit the Court's analysis. GE's effective use of privilege, allowed by the Federal Circuit's precedent, combined with the Federal Circuit's high standard of evidence for deliberateness post-*Therasense*, led to insufficient evidence of an effort to deliberately deceive the PTO. Because of the privilege problems, a full viewing of the '705's history was outside of this Court's view, making a finding of deliberateness impossible. These aforementioned structural and policy issues will last beyond this case. From the evidence that is before this Court, there is evidence that GE was aware of the competitors' prior art, and its exclusion during the application process likely allowed GE to obtain broad patent claims for the '705. Yet there is insufficient documentary evidence that GE considered it material to the '705 patent. Thus, because Mitsubishi's version of the events it is not the *only* reasonable explanation by clear and convincing evidence, this Court must rule for GE. *See Therasense*, 649 F.3d at 1290–91 (“Hence, when there are multiple reasonable inferences that may be drawn, intent to deceive cannot be found.”). Furthermore, the Court must regrettably enter judgment on a series of patent claims that are likely to be rejected, because there are no other options available. As a result, the Court finds for General Electric.

## **V. '705 Patent History**

### **B. The Filing of the Patent**

The initial '705 application filed in 2006 actually sought to patent all methods and apparatus for *low voltage ride through*, something GE now concedes was very widely anticipated by prior art in 2006. Any art that covered either low voltage ride through (LVRT) or zero voltage ride through (ZVRT) was relevant to that 2006 application. Yet the GE employees submitted only a single GE patent reference from 2003 relating to LVRT.

The U.S. Patent & Trademark Office (PTO) examiner assigned to the '705 application independently discovered another of GE's own prior LVRT patents and on that basis, rejected the broad '705 LVRT claims. But he did not independently focus on any ZVRT prior art and the GE employees did not identify any. In February 2009, he suggested that he would allow those claims if they had a ZVRT limitation, and GE amended its application in June 2009 to make sweeping claims for all methods of achieving zero voltage ride through. Under GE's theory, the '705 patent application sought to patent ZVRT for any duration and for all techniques for achieving ZVRT through the controls within the turbine. Less than three months after the issuance of the '705 patent, GE asserted it against Mitsubishi. In the initial trial in this Court, GE asserted that its patent covered methods for achieving ZVRT of any duration. GE then claimed that it practiced the invention because its technology could handle zero voltage at the point of interconnection for 200 ms. GE claimed that Mitsubishi infringed because it used a different technique that permitted 150 ms of ZVRT. On this basis, GE won a jury verdict of \$170 million.

GE claims that the prior art is distinguishable because it does not provide ride through for a zero volt fault at the base of the turbine. Yet the '705 patent claims contain no such limitation. GE never identified zero volts at the base of the turbine as a limitation during the initial trial, nor did it show that Mitsubishi's allegedly infringing technology could ride through a zero volt event at the turbine base. Also, it is clear that the relevant pieces of prior art were encountered by the



key GE players. As a result, the Court can infer the *possibility* of inequitable conduct, but without clear and convincing evidence as defined by the Federal Circuit's post-*Therasense* precedent, the Court cannot find it.

## **B. The Key GE Players Accused of Inequitable Conduct '705**

The doctrine of inequitable conduct is based on the applicant's duty of candor and good faith in dealing with the PTO, including the duty to disclose material information. 37 CFR § 1.56. This duty is owed by (1) each named inventor, (2) each attorney or agent that prepares or prosecutes the application, and (3) every other person who is substantively involved in the preparation or prosecution of the application. *Id.* The Federal Circuit defines "substantive involvement" broadly to mean "that the involvement relates to the content of the application or decisions related thereto, and that the involvement is not wholly administrative or secretarial in nature." *Avid Identification Sys., Inc. v. Crystal Import Corp.*, 603 F.3d 967, 974 (Fed. Cir. 2010). The five key GE players – James McGinness, Einar Larsen, Nick Miller, Scott Frame and Bob Delmerico – all meet the Federal Circuit's test for substantive involvement. McGinness, the chief IP Counsel for GE Wind, played the central role in the preparation and prosecution of the '705 patent. McGinness was responsible as the lawyer, Larsen as a co-inventor, and Miller, Frame and Delmerico, by their own admissions and the testimony of others, had substantive involvement.

## **VI. Wind Industry Background**

As the Court has noted, the key GE players did not simply omit a number of highly relevant patents from the '705 application, they omitted the state of the entire wind turbine industry. Three to four years before they filed their '705 patent application, wind turbine

manufacturers around the world had developed the capacity to ride through zero voltage faults. GE's competitors did not use the shorthand "ZVRT" to describe their capabilities – that phrase was created by GE as a marketing tool. Vol. 2A Tr. 101:19-22; *see also* DTX- 954 (discussing market strategy for LVRT III and referring to it as "zero voltage ride through" and "0% for 600 ms, and possibly up to 1 second in the future"). In fact, as late as February 2005, GE was still referring to its ZVRT option as "LVRT-3." *See, e.g.*, DTX-480 at GENDTX01951184 ("The LVRT-3 option for the 1.5MW turbine delivers ride-thru capability down to 0% voltage at the point of interconnection for 1 second."). The novelty of the term "ZVRT," if not the technology, made it more difficult for the PTO examiner to do computer word searches for prior art.

#### **A. Grid Code ZVRT Requirements**

The grid codes are important because they tracked precisely the progress of the industry in achieving it, and showed the standards that were commonplace in the industry. For example, E.ON Netz, a large transmission system operator (TSO) in Germany, formulated its grid interconnection standards by holding meetings directly with the manufacturers, to confirm their capabilities. (Vol. 1B Tr. 20:18-22:4, 28:16 – 30:3). In April 2003, E.ON decided to move from a standard requiring ride through of 15% voltage to one requiring ride through of zero voltage faults for 150 ms. (Vol. 1B Tr. 24:17-25:7). On August 1, 2003, E.ON issued its 2003 grid code, which included requirements for low voltage ride through for 625 ms and zero voltage ride through for 150ms. *See* Vol. 1B Tr. 27:24-28:4; DTX-1166. Other regions developed similar standards. In Australia, the National Electricity Code Administrator also required wind turbines to be capable of riding through zero volt faults at the point of interconnection ("POI") for 175 milliseconds. *See* Vol. 5A Tr. 31:4-20. By November 2002, NECA sought to apply the ZVRT requirement to all newly proposed wind farm projects, such as Wattle Point in South Australia.

*See* Vol. 5A Tr. 32:3-34:16; DTX-2280. Although GE lost out on the project, Miller represented to the potential customer in February 2003 that the “GE 1.5 megawatt machine equipped to satisfy the Australia NEC code requiring operation through extremely low (zero voltages) will continue operation down to zero voltage without tripping from the grid.” Vol. 5A Tr. 33:6 – 13; DTX-2814.

### **B. GE’s Competitors Develop and Patent “ZVRT”**

In line with the grid codes adopted in 2003, GE’s European competitors were the first manufacturers to develop technical solutions to capable of riding through zero-voltage events, and to seek patents on the new technology. First came Vestas, a Danish company, the largest wind turbine manufacturer in the world. Vestas developed several different techniques in 2002 and 2003. (Vol. 2A Tr. 17:21-18:6, 23:21-25:5). And in December 2002, eighty Vestas modified V80 turbines went into operation at Horn’s Reef, the first large-scale off-shore wind farm in the world. (DTX-1207). These turbines had controls-based capability to ride through zero voltage events at a distant location. (Vol. 5A Tr. 57:12-17). In June 2003 (Spain) and October 2003 (Denmark), Dr. Sigrid Bolik from Vestas presented papers on the achievement. (Vol. 5A Tr. 11:6-20, 15:7-16:3). Both papers explained that, with the technology in modified V80 turbines at Horns Reef, the “turbine will always be connected to the grid, even at 0 voltage for 200 ms.” DTX-1207; DTX-1208; Vol. 2A Tr. 18:14-19:5. Almost simultaneously with the presentation in Denmark, Vestas engineer Steven Saylor similarly presented this capability in the United States at a meeting held by the independent transmission system operator of New England (“ISO New England”) on October 20, 2003. Vol. 5A Tr. 9:13-10:8. On a different track, Vestas sought to patent more advanced techniques. In February 2003, Vestas filed international patent application Nielsen '936. (DTX-1212).

Enercon, the leading German wind turbine manufacturer, also confirmed in 2003 that it was able to comply with the E.ON 2003 Standard. (Vol. 1B Tr. 28:16-29:24) (App. 31-32). On September 23, 2003, Enercon filed the European patent application that led to Wobben '941. (DTX-1201). One month later, on October 21, 2003, Stefan Hartge of Enercon presented his paper at the Denmark conference and disclosed the substance of Wobben '941. (DTX-1202). Miller sat on the same panel as Hartge when Hartge made the presentation. *Id.*; (Vol. 5A Tr. 11:6-20). Thus, two leading European manufacturers had announced that they could achieve control-based zero voltage ride through during 2003.

### **C. GE Also Achieves Zero Voltage for 100 ms**

It was at this time that GE began to demonstrate that it, too, could achieve zero voltage ride through. On June 20, 2003, just days after the conference in Spain, a team led by Scott Frame conducted successful pre-production tests of the new GEIS converter for zero volt faults as measured at the base of the turbine for 100ms. (DTX-1214). The internal GE test report stated that the converter “passed all of these tests operating flawlessly during and after the faults.” *See Id.*; Vol. 5A Tr. 79:9-20. Then, just a month later, GE successfully field-tested this GEIS converter on an actual wind turbine in Tehachapi, California. *See* Vol. 5A Tr. 81:17-82:10; DTX-1213; [DTX-1572]; DTX-2720. 5 After the successful ZVRT field tests, the GEIS converters immediately went into production. *See* Vol. 5A Tr. 82:11-18; DTX-1213; DTX-2720.

By the end of the year 2003, GE had commissioned wind turbines using the very same model of GEIS converters at wind farms at Colorado Green and Sweetwater I. *See* Vol. 5A Tr. 82:19 – 84:17; DTX-1573. The turbines were set to ride through grid faults that went down to 5 percent of rated voltage when measured within the turbine – that is, on the generator side of the

pad-mount transformer impedance. This meant that the Colorado Green and Sweetwater turbines were still riding through zero voltage events at the point of interconnection. When voltage was zero at the point of interconnection, the voltage at the turbine would remain 10% to 15% for at least 100 ms or more, and this was well over the 5% setting below which the turbines were set to trip offline. (Vol. 4 Tr. 17:24 – 20:25). The PTO's recent RAN fails to adequately grapple with these facts.

**D. More Grids Require ZVRT; GE and Its Competitors Confirm They Have ZVRT Capability, GE Moves to Patent Its Own**

In early 2004, the United Kingdom's grid regulator and its three grid operators met with wind turbine manufacturers regarding proposed changes to the grid code, including a requirement for ride through at zero volts for 140 ms at the POI. In May 2004, National Grid, one of the UK grid operators who interviewed manufacturers released a report summarizing those meetings, which confirmed that at least 8 of 10 major turbine manufacturers had the technical capability and commercial availability to achieve this goal. DTX-1495 at 7. This included Enercon and Vestas, among others. *Id.* at 5. The UK Grid Code ultimately made this 140 ms ZVRT standard mandatory for all utility-scale farms, effective on June 1, 2005. *See* Vol. 5A Tr. 28:18 – 29:5; DTX-2802. In May 2004, GE obtained a cross-license to Enercon's ZVRT technology. (Vol. 3A Tr. 90:3 – 90:24). With the help of Mr. McGinness, GE settled a lawsuit against Enercon and obtained a broad cross-license over "Electrical Control Patents" relating to "grid transients of voltage" for which applications had been filed prior to the agreement or within 5 years of its anniversary. *See* Vol. 3A Tr. 90:3–91:20; PTX-490.

Beginning in September 2004, Frame was appointed to manage a GE's ZVRT program team, which included Larsen, Miller and Delmerico. The team, whose purpose was to advance

GE's ZVRT capability beyond the 100 ms achievement, had weekly meetings on their progress and was advised by McGinness. *See* Vol. 5A Tr. 21:21 – 22:25, 88:20 – 89:11. In 2004, ZVRT requirements began to appear in the U.S. The Western Electricity Coordinating Council (WECC), which regulates grid codes in the western United States, had proposed a new standard requiring ZVRT for turbines connected to the grid in its region. *See* DTX-2215; Vol. 5A Tr. 29:10-30:13. The standard would have required ride through of a “normal three phase fault” – which was translated by industry participants to mean ZVRT for roughly 3 to 8 cycles, which is roughly 50 to 133ms. (DTX-2215). In October 2004 – the same month that WECC proposed its standard – GE demonstrated to its largest customer, Florida Power & Light, that GE wind turbines using the GEIS converter were capable of ZVRT for 200 ms. *See* DTX-2215; Vol. 5A Tr. 29:14 – 30:21.

In an October 6, 2004 email from Miller to Frame, on which both Larsen and Delmerico were copied, Miller noted that a new customer's “ZVRT requirement . . . is limited to 0.1 sec [100 ms.]. The agony is Hawaii [600 ms] which aint an order yet! The Great Britain GC (50hz for 140 ms) and AESO (Alberta is 200 ms.) It's my opinion that most 60 hz. [North American] apps will be met with 200 ms.” (DTX-509) (App. 1552). Less than a month later, in November 2004, Clipper Wind, a US wind turbine manufacturer created by former GE Wind employees, filed the Erdman '083 patent application. (DTX-1199). Erdman '083 was published on June 9, 2005. (*Id.*).

#### **E. GE Approves Filing of '705 Patent Application**

On December 20, 2005, eight days after FERC Order 661A, the GE Wind Patent Review Board, which included McGinness, began what became the '705 patent application. *See* DTX-

2691; Vol. 3A Tr. 40:24 – 43:6; Vol. 3B Tr. 47:11 – 49:11. About six months later, four of the five key GE players – Miller, Frame, Delmerico and McGinness – formed the Grid Interconnect IP team “to review existing patents, find gaps in IP coverage and develop a strategy in developing new IP concepts.” (DTX-1904). Informed by the team’s analysis, McGinness reviewed the application and sent prior art to outside counsel to be cited in the '705 patent application. (Vol. 3A Tr. 65:2 – 66:15). While Frame organized meetings between the inventors and counsel, Miller reviewed drafts of the application. (Vol. 5A Tr. 23:1 – 24:19, 69:6-23). On October 20, 2006, GE filed the application for the '705 patent. (DTX-1505). Its independent claims sought to patent virtually all methods and apparatus that could provide controls-based *low* voltage ride through. (*Id.* at 20, 75). Although low voltage ride through had been required in Europe, the only prior art reference disclosed by GE relating to LVRT or ZVRT in the 2006 application was Janssen '188, filed in January 2003, almost four years earlier. *See* Vol. 5B Tr. 40:11-41:2; DTX-1505. GE did not include a single reference to any of the patents published by its competitors. *Id.* Nor did the application explain that since July 2003, GE had installed an LVRT wind farm at Taiban Mesa or that since December 2003, GE had installed LVRT at two operating wind farms – Colorado Green and Sweetwater. In the original application, ZVRT appeared only in a dependent claim. (DTX-1505).

#### **F. PTO Initial Rejection and Amendment**

On February 17, 2009, the PTO examiner initially rejected original Claims 1 and 8 (which issued as Claim 7) based on the examiner’s independent discovery of Weng '248, another LVRT patent application filed by GE. *See* Vol. 5B Tr. 41:10-42:14 (App. 342- 43); DTX-1505. The decision stated “[i]t would have been obvious to one having ordinary skill in the art at the

time the invention was made to design the system as disclosed by Weng et al . . . .” (DTX-1505). The examiner, who had no ZVRT prior art before him, indicated that Claims 2 and 9, *inter alia*, which required ride through at zero volts, “would be allowable if rewritten in independent form.” *Id.* On June 17, 2009, GE amended the claims to include the ZVRT limitation. *Id.* GE added a limitation to Claims 1 and 7 so that they only covered ride through of a voltage disturbance down to “approximately zero volts for the undetermined period of time, thereby facilitating zero voltage ride through (ZVRT).” *Id.* But the key GE players did not disclose any prior art references relating to “ZVRT,” including Erdman '083, Wobben '941, and Nielsen '936. GE also did not disclose any of its own prior uses. Thus, the '705 patent issued on December 8, 2009 without the PTO examiner having before him any of the prior art relating to the development of ZVRT after Janssen '188.

#### **G. The Number of Material Omissions is Significant**

The Court finds that the number of omissions is significant. There is no “magic number” of omitted pieces of prior art that constitute inequitable conduct, however GE’s decision to withhold the entire state of the wind turbine industry from the Patent Office most certainly creates a problem. In *Aventis*, the district court found that the omission of *two* separate, highly material prior art references was significant in that it revealed a course of conduct to deceive the patent office. *Aventis Pharma S.A. v Hospira, Inc.*, 743 F. Supp. 2d at 354. Other material omission cases have found that the existence of more than one material omission supports an inference that the omissions were intentional. *See In re Beaubouef*, 966 F.2d 174, 178 (5th Cir. 1992) (affirming bankruptcy court’s finding of intent to deceive based on “the existence of more



than one falsehood, together with [the debtor's] failure to take advantage of the opportunity to clear up all inconsistencies and omissions when he filed his amended schedules").

Here, there were far more material omissions than in *Aventis*. The key GE players failed to disclose not two or three material references but far more: the patent applications by Erdman, Wobben and Nielsen; as well as the presentations from Bolik, Hartge and Saylor, and the public uses of both GEIS converters achieving ZVRT (Colorado Green and Sweetwater) and the PLL state machine achieving LVRT (Cowboy Wind). The omitted references reveal that the technology for connecting wind turbines to the electrical grid had significantly progressed from the Janssen '188 application filed in January 2003 and that numerous industry players had already invented ZVRT technology long before GE filed the '705 patent application. By the end of 2003, GE had already demonstrated the zero voltage ride through capability of its GEIS converter at Salem, field tested the converter at Tehachapi, and installed it at two locations. By October 2005 – one year before the filing of the '705 patent application – almost every manufacturer had LVRT capability and at least three GE competitors had controls-based ZVRT capability. Mitsubishi demonstrated at trial that GE monitored the prior art possessed by its rivals – and distributed that information within the company. (Vol. 3A Tr. 55:13-63:21; DTX-1492 (Dkt. No. 316-2)). Nonetheless, Mitsubishi failed to conclusively prove that GE considered the prior art material to the '705 application and deliberately withheld it in an effort to deceive the PTO.

## VII. Prior Art

### A. Erdman '083

Clipper WindPower – a U.S. wind turbine manufacturer – filed the Erdman patent

application in November 2004 and published it on June 9, 2005. *See* DTX-1199. The PTO's recent Right of Appeal Notice no longer rejects claims 1 and 7 in light of Erdman. It states that "[a]s such, it seems to the examiner that Erdman does not teach staying connected to the grid for voltages that, at a minimum, fall below 35 volts, and therefore does not stay connected for voltages falling to approximately zero volts. As such, the rejection is being withdrawn." *Right of Appeal Notice* at 24. Nonetheless, the Court disagrees and finds Erdman patent is material prior art. The PTO's current finding relies on the fact that on the turbine side of the transformer, voltage is approximately 35 volts; as such, it is not the 5% needed for synchronization to stay connected to the grid. Yet the PTO does *not* explain its sudden reversal as to the ability of Erdman to ride through zero-voltage events at a distant location because of residual impedances of 5-10% as measured at the turbine.

Throughout the trial, GE argued that the Erdman patent is not material because cannot teach ride-through at the high-side of the pad-mount transformer. DTX-1199 at [0016]. Yet even on its face, Erdman addresses faults down to zero:

[E]ven if voltage is zero at a fault point at a distant location on the utility collection, distribution, sub-transmission, or transmission system, impedance between the generator and the fault will still create a voltage waveform as long as current is supplied.

DTX-1199 at [0035]. Furthermore, Erdman explains, "impedances between the wind turbine converter system and the sub-transmission system (pad mount transformers, substation transformers, length of conductors, etc.)" enable the generator to remain connected "even if voltage at the transmission or collection system fault is zero." *Id.* at [0047]. In other words, the electronic impedances from the system do not disappear during that fraction of a millisecond. The Court was persuaded by Dr. Harley's testimony that impedances from the transformers would result in higher voltage at the turbine than at the fault. Vol. 2A Tr. 9:12-22. Thus, the zero

voltage event at a distant point on the system, will still allow a measurement of 5% voltage at the turbine, allowing the turbine to stay connected.

In fact, GE's own witnesses, Einar Larsen and James Lyons, agreed at trial with the basic principle that, due to impedances, there will be voltage at an operating turbine during a zero voltage event on the grid. *See, e.g.*, Vol. 4 Tr. 20:11-19, 30:10-21 (Larsen); Vol. 6A Tr. 24:2-15 (Lyons). Additionally, a diagram from Larsen's own "Converter Control Concepts to meet Severe Grid Requirements with GE 1.5 MW Wind Turbine Generators," prepared on January 14, 2005, contemplates that impedance – from at least two wind farm and turbine transformers – will result in there being as much as 10-15% residual voltage at the turbine during a zero-voltage fault. The records before the Court show that Dr. Lyons communicated this same position to the key GE players in 2003. *See* DTX-1568 (July 2003 email from James Lyons indicating that during a zero voltage event at the point of coupling, 10-15% volts "should be reflected back to the turbine"); Vol. 6A Tr. 24:2-15.

GE's attempt to avoid Erdman '083 focuses on only a single embodiment of the '705 patent, and is inconsistent with industry practice and GE's own documents. *See, e.g.*, Vol. 4 Tr. 54:6-25. First, GE's preferred construction is not the broadest reasonable construction of the claims, as mandated by *Therasense*. Yet Larsen sought to testify that the '705 patent addresses faults at a single location, point 242 on Fig. 2 of the patent, and "nothing else matters." Vol. 4 Tr. 54:18-21; *see also* Vol. 6B Tr. 17:2-12 (Grady). This theory only invokes a single embodiment of the '705 patent, *see* DTX-1509 col. 4, l. 34, while ignoring the relevant claim language. In fact, there is nothing in the claims of the '705 Patent that refers to this location. The claims refer instead to the voltage of the "electric power system," i.e., the grid. *See id.* col. 11, l. 48-54. It is the language of the *claims*, not the language of an illustrative embodiment, that controls the

scope of the claims. *See Falana v. Kent State Univ.*, 669 F.3d 1349, 1355 (Fed. Cir. 2012) (“[T]his court has ‘cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification’ . . . ‘[W]e are constrained to follow the language of the claims, rather than that of the written description.’”) (internal citations omitted). Under the “broadest reasonable construction,” *Therasense*, 649 F.3d at 1292, a fault on the “electric power system” would encompass a fault at a more distant location, such as the point of interconnection with the grid, or the grid itself. In light of the broad language of its claims, GE cannot narrow its patent.

Furthermore, GE’s interpretation contradicts industry practice or GE’s own documents. The emerging grid codes, which GE used in developing the ‘705 Patent, describe riding through disturbances on the grid – at the point of interconnection or the grid side of the plant’s step up transformer – not at the pad-mount transformer. *See, e.g.*, DTX-175 (FERC Order 661); DTX-1967 (Great Britain’s grid codes will soon require “0% at POI for 140 ms”); DTX-1972 (June 2003 email from N. Miller indicating that Western Power Australia has proposed “zero voltage at POI for 1 second”); DTX-2215 (WECC LVRT standard will require zero volts at the point of interconnection for up to 8 cycles). The record also shows the GE’s customers shared this understanding. *See* DTX-480 (Hydro Quebec contract would “deliver ride-thru capability down to 0% voltage at the point of interconnection for 1 second”); DTX-1995 (Romano is prepared to tell Hawaiian customers that GE can do 0 voltage for up to 1 second at the “point of common connection”); DTX-2121 (Sweetwater Agreement).

GE’s internal documents consistently show that its goal was to ride through zero volts at the point of interconnection, not elsewhere. *See* DTX-441 (email from R. Delmerico dated July 23, 2004 stating as an internal goal “0% voltage at the PCC for 1.0 second”); DTX-164 (Wakileh

memorandum indicating that “[w]ork is ongoing to meet a fault ride-through requirement of 0% voltage for 1 second at the point of interconnection”). GE did not provide any evidence suggesting that any customer was interested in ZVRT at the pad mount transformer. Additionally, GE’s own concept document, “Converter Control Concepts to meet Severe Grid Requirements with GE 1.5 MW Wind Turbine Generators,” shows that, so long as the fault occurs on the high-side of the pad-mount transformer, there would at least be a minimum 5% impedance of the pad-mount transformer itself—impedance enough for Erdman to ride through despite its need for 5% rated voltage. *See* DTX-268. Dr. Grady’s mistaken belief—repeated in the PTO’s RAN—that Erdman does not ride through zero volts at the high-side of the pad-mount transformer is based on an assumption that Erdman requires 5% voltage at some location *outside the turbine*, Vol. 6A Tr. 99:7-100:1, when in fact Erdman is explicit that the 5% measurement is taken at the turbine. *See* Vol. 2A Tr. 56:18-57:3.

The Court finds that Erdman is material to Claims 1 and 7 of the '705 patent. The claims in the '705 Patent are extremely broad, covering a method and apparatus of ride-through down to approximately zero volts on the electric power system. Given that breadth, Erdman is material. The Court therefore disagrees with the PTO’s current position and finds Erdman is material to claims 1 and 7.

#### **B. Wobben and Hartge**

Aloys Wobben, a principal owner and engineer of Germany’s largest wind turbine manufacturer, Enercon GmbH, filed the Wobben '941 application in September 2004. *See* DTX-1201. It was published on April 7, 2005. *Id.* This capability had also been announced earlier. Stefan Hartge, an Enercon engineer, presented a paper on the invention at an industry conference in Billund, Denmark in October 2003. *See* DTX-1202. The Hartge paper was called “Ride-

Through Capability of Enercon-Wind Turbines.” *Id.* The parties agree that Hartge’s paper is functionally identical to Wobben ‘941. *See* Vol. 1B Tr. 116:7-13; Vol. 6A Tr. 95:14-19.

In the recent right of appeal notice, the PTO found that Claims 1 and 7 are no longer rejected in view of Wobben ‘941. The RAN states that “[t]herefore, based on the evidence in the case, it is the examiner’s position that Wobben does not remain connected to the grid for grid voltages dropping to approximately zero volts. As such, the rejection is being withdrawn.” *Right of Appeal Notice* at 34. Nevertheless, the Court finds that Wobben teaches a method of riding through a zero voltage disturbance and is therefore material.

GE’s arguments regarding Wobben—endorsed by the PTO’s RAN—are very similar to its arguments about Erdman: that because the patent requires voltage at the turbine, the zero-voltage events occurring at a distant location are not true ZVRT, and thus are immaterial as prior art. Again, GE narrows the wide-ranging patent claims of the ‘705 patent, and then claims the ability of Wobben to ride through zero voltage events is immaterial because the zero volts are not measured at the turbine. But the Wobben patent is explicit in stating its ability to ride through zero voltage events. Figure 5 of the patent illustrates a configuration for riding through a “symmetrical 3-phase fault F with zero impedance.” DTX-1201 col. 9, l. 14-17. Dr. Harley testified to the Court that “a three-phase fault with zero impedance” is a zero voltage event. *See* Vol. 2A Tr. 9:23-10:21. According to Dr. Harley, because the “fault is reasonably close to the pad-mount transformer,” Wobben represents a “pretty severe test” of ride-through capability. *See* Vol. 1B Tr. 119:17- 120:16.

Wobben measures voltage on the generator side of the pad mount transformer, not at the point where the fault occurs. *See* Vol. 1B Tr. 121:14-23 (App. 50). “[T]he impedance of the pad-mount transformer typically is around 5 percent, 6, maybe 7, depends from one manufacturer to

the other.” *Id.* at 121:23-122:1. Thus, there will be some voltage at the place of measurement even when the voltage is in fact zero, or “approximately zero,” as claimed in the '705 patent, on the grid side of the pad mount transformer. *See id.* at 122:7-13. Wobben asserts that he tested zero voltage, though GE’s expert, Dr. Grady, did not believe the graphs showed sufficient evidence. Vol. 6B Tr. 36:10-2 (“Q. So that’s saying that Wobben tested a zero fault condition, correct, when there is zero voltage? A. That’s what he says. But I don’t think the graphs prove that out.”).

In support of its theory that Wobben discloses only low voltage ride-through, GE refers to a line at page 7 of the English translation of Wobben that describes testing with “residual voltages of 0.1 ... 0.8 pu.” DTX-1201 col. 7, l. 5-6; Vol. 6A Tr. 92:13-93:9. According to Dr. Grady, this means that “the lowest voltage that [Wobben] considers at the turbine is 10 percent.” Vol. 6A Tr. 93:6-2. Therefore, GE argues that the simulation fault studies discussed in Wobben ‘941 apply only for faults where the grid voltages measured at the turbine are between 10% and 80%. Yet the preceding page of the application states that the passages relate to German regulatory requirements for “models” of wind turbines, not the capability of the Wobben technique. *See* DTX-1201 col. 6, l. 24-25 (“Set forth hereinafter are the specific requirements for models of wind power installations.”). GE confuses the requirements applicable to those simulations with the actual results that Wobben obtained from testing real wind turbines with zero voltage faults. For example, GE relies heavily on Figure 10 for voltage greater than zero. *See, e.g.,* Vol. 1A Tr. 53:14-54:16. But Dr. Harley testified, “After they did the test of zero voltage ride through on the network [,] they did further tests at the Enercon facility evaluating the capability of the power electronic models, and those results [are] what is showing in Figure 10.” Vol. 2B Tr. 66:1-5.

Therefore the Court finds that an engineer studying Wobben '941 can see that these were tests done in a lab, not on a wind turbine on the grid, and the tests looked at only one component, not ride through capability. The time-axis on Figure 10 – showing a fault applied for over 3 seconds – displays this point. The result in Figures 10 through 13 can be contrasted with those in Figures 6 through 9, which “show measurement results for the test system shown in Figure 5” – that is, the actual wind turbine generator connected to the grid. DTX-1201 col. 3, l. 22-23. GE’s expert, Dr. Grady argues that Wobben is not material because some diagrams in the application do not show successful performance of ZVRT. *See* Vol. 6B Tr. 36:10-2. Even if this is true, an applicant must err on the side of caution and presume that the invention is enabled. *See In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012) (internal quotations and citations omitted). The patent examiner is not in a position to decide whether an invention described in a prior patent actually works, and so must presume that it does. An applicant cannot discard prior art on this basis.

Wobben also explains that, during fault conditions, this power may be dissipated by a “chopper” to prevent overspeeding of the rotor. (DTX 1201 at 13:4-6). Additionally, the residual impedances between the fault and the turbine ensure that there will be terminal voltage of approximately 5 to 7% inside the turbine during a zero voltage event. (Vol. 1B Tr. 121:14-122:1). This is voltage enough to produce power at the recorded levels inside the turbine. Wobben does not say that active power will pass through the fault, or be delivered to the grid, during a zero voltage event, as suggested by GE. As a result, the Court finds that Wobben ‘941 is material to claims 1 and 7.

### **C. Vestas Prior Art**



### 1. Nielsen

Nielsen '936 describes a “method and apparatus for controlling a power-grid connected wind turbine generator during grid faults.” *Id.* In particular, it teaches different ways of configuring impedances inside the turbine to facilitate ride through of grid disturbances, including ride-through at “low voltages *or* zero voltages on the power grid.” *Id.* at 2. The PTO’s RAN no longer rejects Claim 7 in view of Nielsen. It states that “[t]he examiner agrees with the PO [patent owner] that the claims require the entire machine remain connected to the grid when the voltage falls to approximately zero volts.” *Right of Appeal Notice* at 41. It further states that “when read in light of the specification, claims 1 and 7 of the ‘705 Patent require that the entire machine remain connected to the grid for voltages that are approximately zero.” *Id.* Finally, the notice states that “the examiner finds the Nielsen ‘936 does not teach that the entire machines remains connected to the grid for voltage...there are approximately zero volts, as required by the claims. Therefore, the rejection is being withdrawn.” *Id.* at 42. The PTO has not yet issued a new decision on claim 1 of the ‘705 patent, though GE writes this it expects the previous rejection will likewise be withdrawn.

Despite the PTO’s most recent ruling, the Court finds that each of Nielsen’s several “preferred embodiments” is independently material to the patentability of claims 1 and 7 based on the PTO’s evidentiary standards. In evaluating whether an undisclosed reference is material for purposes of inequitable conduct, courts are instructed to give claims their “broadest reasonable construction,” not the construction applied for purposes of analyzing infringement. *Therasense*, 649 F.3d at 1292. The Court finds that even if the stator disconnects, as GE asserts, the rotor remains connected to the grid, even at zero voltage. The DFIG machine depicted in Nielsen Figure 1 remains connected to the power grid through a rotor which continues to supply

current during and after faults down to zero volts. *See* DTX-1212; Vol. 2A Tr. 27:20-28:25, 29:13-30:4. Applying the broadest reasonable construction standard, Nielsen is material to the ‘705 Patent.

## **2. Saylor's Presentation**

As GE submits, “the Saylor's Presentation (DTX-1063) repeats precisely what is described in Nielsen.” GE Br. 34. And for that reason, the Court finds that it is material prior art. GE focuses on the wrong part of Saylor's October 2003 presentation on the achievement of zero voltage ride-through at Horn's Reef. A table in the presentation, reproduced below, very explicitly shows in its last row that the modified V80 turbine at Horns Reefs would remain connected during zero voltage events for up to 200 milliseconds. (DTX 1063 at 9). GE argues that the Saylor's presentation is not material because it describes a solution involving disconnection of the stator. (GE Br. 34). GE points to a slide entitled “Advanced Grid Option 3,” in which Saylor's refers to “disconnection of the stator” and “reconnection after 3 s.” (DTX 1063 at 13). But Advanced Grid Option 3 is *not* the solution that was implemented at Horns Reef. The same slide shows that the Advanced Grid Option 3 was applied to a different kind of machine – 2.0 MW as opposed to 1.8 MW – and that the machines with Advanced Grid Option 3 were first delivered in April 2003, as opposed to late 2002 when the 1.8 MW wind turbines at Horns Reef were commissioned. (*Id.*) Thus, Saylor's is material because it describes the achievement of ZVRT for 200 ms at Horns Reef in late 2002. The discussion of disconnection of the stator refers to a different version of the V-80.

## **3. Bolik Paper**

The Bolik Paper (DTX-1207) also describes the same solution of during a grid disturbance that is shown in Nielsen and the Saylor's Presentation. According to GE, the Bolik papers are immaterial because, like Saylor's, they describe a ZVRT solution involving disconnection of the stator. (GE Br. 35). But, as the Court has already shown, where Dr. Bolik refers to disconnection of the stator, she is discussing the ride-through method of an *earlier* turbine model, the Vestas V66. (DTX 1208 at 5) ("In Figure 6 a simulated example for the control algorithm *implemented in a V66 turbine* is shown. After an occurrence of an error in the grid . . . the following steps are performed: 1. The stator of the generator is disconnected from the grid . . . .") (emphasis added). Indeed, Nick Miller, GE's own employee and an attendee of Bolik's conference in Denmark in 2003, admitted that the solution described by Bolik did not rely on disconnection of the stator. (Vol. 5A Tr. 14:2-15:5).

GE claims that Figure 7 shows disconnection of the stator. But that figure refers to a different model of the V-80 than was installed at Horns Reef. GE Br. 35-36. GE contends that the Saylor's Presentation, which is dated in October 2003 just like the Bolik Paper, explicitly shows that the V80 wind turbines at Horns Reef used the stator disconnection method. DTX-1063 at 13. Yet the Saylor's paper shows the disconnection method was applied to the 2.0 MW machines, *not* the 1.8 MW machines installed at Horn's Reef. (DTX 1208 at 5). As Bolik explains, the 1.8 MW V-80 installed at Horns Reef remained "will always be connected to the grid, even at 0 voltage for 200ms." DTX-1207 at 4; DTX-1208 at 5. The October 2003 Bolik presentation makes the same point graphically, showing the Vestas V80 riding through a voltage drop down to zero volts for 200 milliseconds. Additionally, the Bolik Paper states that "in order to use the method"—referring to the feature developed by Vestas "designed to tolerate short

time voltage reduction”—Vestas needed “new hardware and control strategies,” which include disconnection of the stator. *See* DTX-1207.

#### **4. Bolik Presentation**

Dr. Bolik also gave a detailed report about the project in a paper presented at the 2003 European Wind Energy Convention in Madrid, entitled “Vestas Handles Grid Requirements: Advanced Control Strategy for Wind Turbines.” DTX-1207. GE argues that the Bolik presentation is immaterial because it describes two alternative ride-through methods – a hardware solution and a solution involving disconnection of the stator – neither of which is within the scope of the '705 patent. (GE Br. 36).

Indeed, the Bolik presentation uses the words “extra hardware” when describing disadvantages of an impedance-based solution to ZVRT. (DTX 1209 at 14). But the Court finds that the “extra hardware” required to implement an impedance-based approach is not the type of heavy hardware, external to the wind turbine –i.e., capacitor banks – that GE has argued would be outside the scope of the '705 patent. *See* Vol. 2A Tr. 99:6-16 (defining the hardware solution as a “capacitor solution”). In fact, Nick Miller has conceded that the Horns Reef solution was control-based rather than hardware-based. (Vol. 5A Tr. 14:13-15:3). The Bolik presentation clearly material because it described a control-based solution that achieved ZVRT for 200 milliseconds and did not involve disconnection of the stator.

#### **D. Severity of the GEIS ZVRT Tests**

Claims 1 and 7 of the '705 patent broadly claim ZVRT for a fault of any duration – one that lasts an “undetermined” or “predetermined” period of time, and by the language of their

claims they cover a fault at any point on the “electric power system” – *i.e.*, the grid. In 2003, the GE Industrial Systems (GEIS) division located in Salem, Virginia, designed and tested a new converter capable of ZVRT, which GE first called the AccuWave converter but later renamed the GEIS Converter. *See* Vol. 4 Tr. 4:14 – 6:19; Vol. 5A Tr. 71:11 – 76:19. GE’s rigorous pre-production testing demonstrated that the GEIS converters would remain connected to the grid during zero volt faults and was capable of ZVRT for at least 100 milliseconds. (DTX-1214). GE admitted that these very converters were then manufactured and used in turbines installed at commercial wind farms by the end of 2003. *See* Vol. 5A Tr. 83:1 – 8; *see also* Vol. 5A Tr. 84:7 – 17; Vol. 3B Tr. 77:14 – 21; Vol. 5A Tr. 64:6-65:11; Tr. 3B at 77:25 – 78:2. As the June 2003 test report explained, the objective and purpose of the testing was “to verify proper operation of the system with *severe* grid faults.” DTX-1214 at GENDTX03964695 (emphasis added); Vol. 5A Tr. 75:13 – 76:8 (App. 316-17). The report included multiple tests for the “most severe faults, with a complete short circuit, down to zero volts at the transformer primary.” DTX-1214 at GENDTX03964701; Vol. 5A Tr. 80:7 – 16.

Despite the severity of the testing, GE did not report any test failures. Evidence shows the GEIS converters passed the tests “far in excess of the specification.” Vol. 5A Tr. 78:10 – 12 (Frame). The report concluded that the GEIS converter “passed all of these tests operating *flawlessly* during and after the faults.” DTX-1214 at GENDTX0394701 (emphasis added); *see also* Vol. 5A Tr. 79:9 – 20 (Frame). By September 2003, George Wakileh, a senior engineer at the Tehachapi site, completed a copyrighted release describing GE’s achievement: “Employing the GE Industrial Systems converter, the GE 1.5MW, 60 Hz wind turbine *can ride through system faults that result in down to 0% grid voltage for a duration of 100 milliseconds*. Work is ongoing to meet a fault ride through requirement of 0% voltage for 1 second at the point of

interconnection.” (DTX-164) (emphasis added). GE Wind marketed the accomplishments of the GEIS converter to potential customers, noting it passed the tests “in excess of the specification, including both single phase and three phase faults down to 0 volts at the transformer primary.” DTX-1221 at GENDTX01230241; Vol. 4 Tr. 12:14 – 15:15; *see also* [DTX-1219].

#### **E. Prior Public Uses at Colorado Green and Sweetwater**

The same GEIS converters that were tested at Salem and Tehachapi were installed and commissioned at the Colorado Green wind farm in southeastern Colorado and the Sweetwater I wind farm in Nolan County, Texas in late 2003. *See* DTX-2631; Vol. 5A Tr. 65:3-11; Vol. 3B Tr. 77:14 – 78:2. Frame testified that the GEIS converter used in the turbines at Colorado Green was “the same converter we saw in the tests and the same one you tested out in California at Tahachapie [sic] . . . .” Vol. 5A Tr. 83:5 – 8; *see also* [DTX-2831] (purchase order for 133 GEIS converters for the Colorado Green and Sweetwater projects). In May 2005, Nick Miller published a paper touting Colorado Green as a model for how wind farms could ride through six-cycle (100 ms) three-phase (zero volt) faults at the point of interconnection. *See* DTX-1630; Vol. 5A Tr. 5:17 – 9:3. Miller then admitted at trial that the paper “indicates clearly in the simulation that Colorado Green rode through a zero volt fault and remained connected to the grid.” (Vol. 5A Tr.8:25-9:3).

GE argues the converters at those sites do not represent “public uses” of ZVRT technology because the Bachmann controllers governing their operation had a parameter set to trip the turbine offline when the voltage in the turbine dropped below 5 percent. (Vol. 4 Tr. 17:24 – 18:2). Once again, GE conflates a parameter for measuring voltage *in* the turbine with measurement of a fault at a point *outside* of the turbine on the grid. (Vol. 2B Tr. 83:23 – 84:9).

Larsen, Lyons and Harley all agreed at trial that, due to impedances, there will still be voltage in the turbine for at least 100 ms during a zero voltage event on the utility grid. Vol. 4 Tr. 30:10-21 (Larsen); Vol. 6A Tr. 24:2-15 (Lyons); Vol. 2A Tr. 53:18 – 54:15 (Harley).

Thus, even with the Bachman controller parameter set at 5% voltage, the GEIS converts could deliver ride through of a zero volt fault at some point on the grid, such as the point of interconnection. For commercial wind farms such as these, the point of interconnection is where the wind farm connects to the utility grid. Vol. 2B Tr. 55:13 – 56:15 (Harley); *see also* Vol. 4 Tr. 19:5-7 (Larsen agreeing that the point of interconnection is “where the wind farm interconnects with the grid”). As a result, Larsen testified that there would be substantial impedances between the turbines and the point of interconnection, such that the measurements within the turbine would still show voltage even during the fault. (Vol. 4 Tr. 20:11 –25). As such, the wind turbines at Colorado Green and Sweetwater I, which could deliver 0 voltage for 100 ms at the point of interconnection, were public uses of the patented technology as well. The Court therefore finds GEIS converters installed at Colorado Green and Sweetwater were capable of riding through zero voltage faults on the high-side of the padmount transformer without the Bachmann controller ever triggering a shutdown.

#### **F. GE Develops ZVRT for Even Longer Duration Faults**

Thirteen months after the Tehachapi tests, in August 2004, GE Wind’s legal department and management grew concerned that Enercon was “issuing something like one or two patents a week to our few each year.” (DTX-2195). This concern prompted Frame’s boss to ask him whether GE’s “zero volts LVRT” technology was protected because GE had “*been quoting it for some time.*” (*Id.*; Vol. 5A Tr. 100:12 – 102:17) (emphasis added). GE’s equipment operated

“flawlessly” during and after zero volt faults applied on the high side of the padmount transformer. DTX-1214 at GENDTX03964701. GE argues that the tests do not indicate ZVRT because they show results at the “optimal condition of full load.” GE Br. 38. Here, GE confuses “optimal conditions” for power generation with “optimal conditions” for performing ride through. *See* Vol. 6A Tr. at 54:3 – 14 (Grady). Yet Dr. Harley testified that while full wind conditions are optimal for generating power, conversely, they are the *most difficult* for ride through, since the turbine must deal with the greatest difference between the power coming out of the generator and the zero volt situation on the grid. Vol. 2A Tr. 39:6 – 40:9. Larsen himself suggested the day before the preproduction tests that full load (i.e. the high speed of 1550 rpm) would be the most severe test for ZVRT. DTX-1579 at GENDTX00118629. GE proceeded to test for ZVRT the next day with those settings, with the report stating that “The most severe case is show here, which is 1550 RPM and 0.9 overexcited.” DTX-1214 at GENDTX03964701. The Court saw no support for the proposition that *lower* blade speed and power output (“partial load”) would be a more severe test. With the success of these tests, GE approved the full-scale production of turbines with the same equipment. DTX-1213; DTX-2720; Vol. 5A Tr. 81:17 – 83:8.

GE also argues that no disclosure to the PTO was necessary because one of the turbine’s postproduction software settings (Parameter 20.19) did not allow for ZVRT. In particular, GE suggests that the turbines would “disconnect if the grid voltage *at the turbine* dropped below 5%” because Parameter 20.19 was set to 5 percent. GE Br. 37 (emphasis added). Again, GE relies on semantics, blurring the lines between the voltage *inside* the turbine, which will never drop below 5%, even in a fault situation, and the grid voltage *outside* the turbine, which could well drop to zero or approximately zero and thereby meet the conditions for the '705 patent. *See*



Mitsubishi Br. 66-67. Yet Parameter 20.19 is based on a measurement of voltage on the generator side of the padmount transformer (inside the turbine). If not, Parameter 20.19 would be thousands of volts higher. *See, e.g.*, PTX-6.0009 (showing the low level voltage at 690V and the medium level voltage at 10,000V).

Even in GE's own certification test applying a severe fault on the high side of the padmount transformer, Parameter 20.19 would still measure at least 5 percent voltage due to impedance. *See* PTX-6.00152, Figure 3.26.1. In 2005, Miller also published a technical paper which used the turbines at Colorado Green as a model for riding through zero volt faults and remaining connected to the grid. DTX-163; Vol. 5A Tr. 8:25-9:3. GE argues that Miller paper reflected a simulation that "did not reflect the actual capabilities of the wind turbines at Colorado Green." GE Br. 59. Yet Miller's paper also stated "for the situation modeled, the simplified equivalent representation is *sufficiently representative of the detailed wind farm system.*" DTX-1630 at GENDTX00408387. Certainly the duration of these faults was shorter and this technology was less advanced than later GE developments, yet it still falls within the broad terms of the '705 patent and is material.

#### **G. Prior Public Uses at Cowboy Wind Farm**

The key GE players also failed to disclose public uses of another kind of technology – a state machine falling within Claims 9 and 13 of the '705 patent. Claims 9 and 13 of the '705 patent essentially claim a control system or wind turbine that is capable of delivering low voltage ride and employs a phase-locked loop (PLL) regulator and PLL state machine. Mitsubishi Br. 70 – 71. GE concedes this detail, but argues that Claims 9 and 13 require the exact four-state PLL state machine described in the exemplary embodiment of the patent. Throughout its questioning

at trial and its brief, GE narrowed all of its questions to whether *the* exemplary PLL state machine—the one developed by Barker in 2005—was being used at Cowboy Wind. *See* Vol. 3B Tr. 96:25-97:6 (asking whether Barker believed that “GE’s 1.5 megawatt wind turbines installed in April of 2005 included *the* PLL state machine”) (emphasis added); GE Br. 42 (“The wind turbines at Cowboy Wind, which were installed in April 2005, did not have *the* PLL state machine . . . .”) (emphasis added). While technically correct, further analysis is needed.

At trial, Mitsubishi showed that GE had developed a three-state PLL state machine as early as 2003. As Dr. Harley testified, DTX-389 reflects a diagram prepared by Sidney Barker with a revision date of November 11, 2003. Dr. Harley explained in detail how State 1 was the “start-up” state when the PLL loses its lock on the grid, and that States 2 and 3 are “run” states, dynamically adjusting values for the PLL regulator in an attempt to match the grid conditions. (*Id.* at 74:7 – 76:20). This PLL technology was used in turbines installed at farms like Cowboy Wind in Weatherford, Oklahoma, where a total of 98 GE 1.5MW wind turbines were commissioned on May 3, 2005 – months before the critical date. *See* DTX-2631; Vol. 2A Tr. 67:21 – 76:20.

The plain language of the ’705 patent states that the “PLL state machine” includes “any number of states” that facilitates the ride-through operation of the wind turbine. DTX-1509. GE fails to address the broad language of the claims (referring only to a PLL state machine) or the express language of the specification (accepting “any number of states”). The claimed invention is not limited to the preferred embodiments or specific examples in the specification. *See Falana v. Kent State Univ.*, 669 F.3d at 1355. Rather, as long as the prior use fell within the scope of claim language, it should have been disclosed.

Barker testified that the computer code on the drawing had the elements of a PLL state machine, including a start-up “mode of operation,” would use gain values to go into a first run ‘mode’ and then change to another run ‘mode’ based on the code. (Vol. 3B Tr. 74:21 – 77:13). GE suggests that the prior use must exactly match the “*exemplary* PLL state machine” set forth in Figure 5 of the ‘705 patent and have four dynamic states. *See, e.g.*, Vol. 6A Tr. 62:3-65:13. Of course, this is wrong as a matter of law: it is the claim language, and not the written description, which defines the scope of the patent. *Falana*, 669 F.3d at 1355. Claims 9 and 13 simply require a PLL state machine – not a *four-state* PLL state machine:

In the exemplary embodiment, state machine 404 is configured to transfer PLL regulator 400 to at least one of four states, or mode, of operation as a function of characteristics of voltage signals received as described above. Alternatively, PLL state machine and PLL regulator 400 includes *any number of states* that facilitates operation of wind turbine 100 as described herein.

DTX-1509 (emphasis added). GE’s suggestion that the PLL state machine must have four states is unfounded under any construction of the patent. Thus, because the claims of the ‘705 are broad and do not specify the number of states needed for the PLL machine, the 3-state PLL machines installed at wind farms like Cowboy Wind were material prior uses.

### **VIII. The Five Key Players Had Knowledge of the Prior Art But Did Not Deliberately Deceive the PTO**

Mitsubishi was ultimately unable to prove a pattern of deliberate deception by GE. While the record shows the key GE players had access to the prior art and likely contemplated its materiality, there is insufficient evidence that they believed it was material to the ‘705 patent and then made a deliberate effort to withhold it from the PTO. By withholding the prior art from the PTO, GE was able to gain a broader patent, but this does not, by extension, indicate a plot to deceive. The Court believes they *should have* considered it material, and indeed *may* have, but

not by clear and convincing evidence. Additionally, the PTO's current Right of Appeal Notice, which does not consider the alleged prior art material, indicates that GE could have credibly reached the same conclusions as the PTO: namely, that the alleged prior art did not need to be included in the '705 application.

#### **A. James McGinness**

The Court finds that James McGinness personally encountered the prior art when sending in the '705 application to the PTO. Nevertheless, there is not clear and convincing proof that McGinness *deliberately deceived* the PTO during the application process, nor in the time after the 705 patent had been granted. Throughout the trial and post-trial briefing, GE relied heavily on the forgetful testimony of McGinness to explain his contact with the relevant prior art. In its briefing, GE summarizes the basic tenor of the testimony: "McGinness could not recall having reviewed any of the art or ever considering whether or not to disclose it in connection with the '705 patent application." GE Br. 43; Vol. 3A Tr. at 73:6-14, 75:3-12, 76:11-77:6, 92:12-24, 111:6-8, 114:17-25, 121:24-122:13, 125:17-23; Vol. 3B Tr. at 7:25-9:23, 10:5-15, 21:8-12 ("I don't recall considering any references that zero voltage dropped down to zero."), 22:2-8. Yet a lack of recollection is not the equivalent to a lack of evidence. While McGinness clearly encountered the prior art and may have considered it material, GE's use of the attorney-client privilege prevented the Court from finding clear and convincing proof of deliberate deception.

As the lead patent attorney for the wind division, McGinness testified that he was "responsible for preparing and prosecuting" the patent. (Vol. 3A Tr. 33:2 – 8). He also testified that, as an "attorney of record" listed on the face of the patent, he had a duty "to disclose all the information that's known to [him] to be material to the patentability of that claim," and he sent

prior art to the outside counsel “with the instruction to cite [it in the application].” (Vol. 3A Tr. 34:7 – 11); (Vol. 3A Tr. 65:2 – 66:15). Moreover, McGinness served as counsel to GE Wind’s ZVRT program team, which met weekly and developed GE’s ZVRT capabilities, as well as the GE Grid Interconnect IP team, which reviewed and analyzed competitors’ ZVRT capabilities, leading up to the '705 patent application. *See, e.g.*, Vol. 5A Tr. 21:21 – 22:25; Vol. 3A Tr. 67:25 – 68:13 ; DTX-426; DTX-1904. The ZVRT program team included Larsen, Miller, Frame, and Delmerico with advice from McGinness. *See* Vol. 5A Tr. 21:21 – 22:25 ; DTX-426. The Grid Interconnect IP team included Miller, Frame, and Delmerico again with advice from McGinness. *See* Vol. 3A Tr. 67:25-68:13; DTX-1904.

McGinness emailed Erdman to James Lyons on May 8, 2006 – just months before the filing of the '705 – and attached to his email an Excel chart describing Erdman. *See* Vol. 3B, Tr. 5 – 9; *see also* DTX-2652 (May 8 email with excel spreadsheet and Erdman '083 attached); PTX-455 (May 8 email). A month later, McGinness highlighted in yellow the portion of the Excel sheet describing Erdman. *See* DTX-2569; Vol. 3B, Tr. 9:23 (“I don’t remember why it was highlighted.”). McGinness again emailed Erdman to a GE patent attorney on October 25, 2007 and received the issued Erdman patent from a GE analyst on April 21, 2009, shortly before GE’s 2009 amendment to the '705 patent application. *See* Vol. 3B:10:1-15 (discussing McGinness Oct. 25, 2007 email); DTX-278 (copy of patent based on Erdman '083 sent to McGinness on April 21, 2009).

Additionally, McGinness encountered the Vestas art, including Nielsen '936, because of his role as adviser to the engineers and his oversight of the licensing program. In February 2006, McGinness received research on competitor grid interconnect IP that yielded Nielsen '936. In September 2006 – just weeks before the filing of the '705 application – McGinness received a

spreadsheet used by the Grid Interconnect IP team to identify key Vestas IP relating to grid connection that described and ranked Nielsen '936. *See* DTX-276; DTX-2669. McGinness later used the results of the Grid Interconnect IP team's work in a presentation on GE's license programs. (DTX-56 at GENDTX07657094). In January 2007, McGinness also circulated a spreadsheet of patents to GE engineers to discuss cross licensing opportunities with Vestas; Nielsen was included on that spreadsheet. *See* Vol. 3B, Tr. 4-5; DTX-2512.

McGinness had negotiated with Enercon back in May 2004 for a cross-license to all of Enercon's grid interconnection patents in settlement of litigation that GE had launched against Enercon. The grid interconnection cross-license that McGinness negotiated picked up rights to Wobben '941, filed in September 2003 and disclosed by Hartge in October 2003. *See* Vol. 3A Tr. 90:3 – 91:20; PTX-490 (cross-license included "Electrical Control Patents" relating to "grid transients of voltage"). Again, McGinness received an abstract used by the Grid Interconnect IP team to identify key Enercon IP on grid connection in September 2006 – just before the filing of the '705 patent application. The abstract described and ranked Wobben '941. *See* Vol. 3A, Tr. 126:10-25; Vol. 3B, Tr. 22:9-17; DTX-1715; DTX-2669. McGinness also encountered the capabilities of GE's own converter. In 2008, he received a spreadsheet showing that 80% of the wind turbines installed by GE through November 2006 used GEIS converters. *See* DTX-2631; Vol. 3B, Tr. 15:5-25.

GE correctly notes there is no direct evidence that McGinness was ever aware of the existence of Hartge, the Saylor's Presentation, the Bolik Paper, or the Bolik Presentation. GE Br. 43. As a result, with regard to McGinness, Mitsubishi has not met its burden with regards to these prior art references. GE conceded that the evidence showed that McGinness had access to Erdman, Nielsen, and Wobben '941, which were at various times included among spreadsheet

listings. GE Br. 43. GE further notes that “McGinness also received or sent email copies of the Erdman and Nielsen publications in connection with efforts to ensure that GE would have freedom to operate within the areas of technology it was developing for its wind turbines.” Vol. 3A Tr. at 123:8-124:8, Vol. 3B Tr. at 5:7-16, 6:17-7:7. The Court views this explanation as vague, but its vagaries do not, by extension prove that McGinness considered that prior art material and then deliberately deceived the PTO.

McGinness also testified repeatedly that competitor patents and published patent applications were identified, typically by GE patent engineers, and information such as the patent title, abstract and/or claims were compiled and circulated in spreadsheet format as part of GE’s continuing effort to ensure that technologies being developed for its products do not infringe valid third-party intellectual-property rights. His testimony about the subject of the Grid Interconnect IP telephone conferences is illustrative:

Q: So you and Mr. Miller and Mr. Frame and Mr. Delmerico get together on October the 18th with access to all the competitor patent literature that’s relevant to the ‘705. Is it fair to assume that the four of you all talked about the ‘705 patent application?

A: I doubt that we did. This grid connection study was about studying third party patent rights to ensure, you know, we understood what they were, so that we were developing our own connection technology, we made sure we were avoiding it. Vol. 3A Tr. at 70:23-71:6; *see also* Vol. 3A Tr. at 38:14-19, 57:24-58:4, 59:2-9, 60:8-11, 60:18-61:2, 71:19-72:4, 99:9-22, 101:21-102:3, 102:12-103:11, 115:1-10, 122:4-13.

Again, the Court is perplexed by McGinness’s explanation. His testimony seems to be an inadvertent admission that the group *was indeed* studying prior art. If not with regard to the ‘705 Patent application, there is no other credible explanation as to why GE employees would be

studying these patents. That said, there is insufficient evidence that when evaluating potential prior art, they considered it material to the '705 patent and then deliberately withheld it.

GE also makes much of the fact that McGinness was not trained as an expert in wind turbine technology, and therefore "his practice was to disseminate such information to the engineers at GE who were working on the subject technology." GE Br. 44-45; Vol. 3A Tr. at 71:19-72:4; Vol. 3B Tr. at 33:6-15; 45:13-46:7 ("What I'm trying to do is get the information to [the engineers] so that they can review it because they have the technical expertise to know what's relevant, and things that are relevant are then brought to my attention."). GE continues: "[E]ven if McGinness had reviewed the references, which he testified he did not, there is no evidence showing that he would have appreciated them because he is not a person of skill in the relevant art." GE Br. 45.

The Court is unconvinced by that line of thinking. "Knowing" that a patent is material prior art does not require a profound and intimate understanding of the underlying technology. Indeed, it is enough to be told by engineers that the patent is relevant prior art, even if the minute technical details remain too difficult to understand. McGinness testified that he personally would not review the patents and publications identified by this process, and would only get involved if the engineers developing the technology raised a concern to him that the art could pose an infringement problem for GE. Vol. 3B Tr. at 22:9-17 ("[W]e talked about the types of documents I would not look at initially. They would be sent to the technical experts who would review them, and to the extent they identify a concern, we would look at the concern related to those.").

Again, the Court does not view this as exculpatory in any way. Indeed, it is logical that the patent attorney on a technical project would consult the engineering experts for their analysis as well. McGinness claims that no one ever suggested to him that any of the art at issue in this



case might be material to the '705 Patent. Vol. 3B Tr. at 22:2-8 ("The other references you are referring to I have no recollection of. So I believe they weren't cited because no one associated them with the '705."). In other words, McGinness testified that among his engineers, none of those who examined the prior art thought it was relevant. This explanation—a combination of a lack of recollection and an affirmation of good faith— is questionable, because the lone reference cited, *Janssen*, is more outdated and less relevant to '705 Patent. McGinness would have the Court believe that his expert engineers examined Erdman, Nielsen, and Wobben '941 and felt that *Janssen* was the *only* relevant prior art. Most importantly, GE argues that "even assuming that McGinness believed there was material art, Mitsubishi's inequitable-conduct claim also fails because of Mitsubishi's failure to adduce any evidence of a deliberate decision by McGinness to withhold prior art with specific intent to deceive the Patent Office." GE Br. 46; Vol. 3B Tr. at 55:4-12. It is here where GE is able to save itself from a finding of inequitable conduct.

First, Mitsubishi contends that "the sheer number of material omissions" in connection with the '705 Patent proves a deliberate decision to withhold known material prior art, pointing to the nondisclosure of "at least eight" prior art references—Erdman, Wobben '941, Nielsen, the presentations from Bolik, Hartge, and Saylor, and the alleged public uses. Dkt. 744 at 83. Mitsubishi argues that the extravagant number of omissions show intent to deceive. GE contends that "this circular logic does not establish a deliberate decision to withhold known material art from the Patent Office." GE Br. 46; *1st Media*, 694 F.3d at 1376-77. GE argues that Mitsubishi is espousing a "should have known" standard by insisting that "[g]iven the sheer number of prior art references, their direct delivery to him, and the extensive monitoring of competitor art in which GE engaged with McGinness's personal encouragement, it would not be credible to

suggest...that the prior art of his competitors left no impression on him at the time he filed for the '705 patent." Dkt. 744 at 87. As previously mentioned, it is here where this Court is bound by the Federal Circuit's precedents in *Therasense* and *1<sup>st</sup> Media*. "As *Therasense* made clear, a defendant must prove that an applicant (1) 'knew of the reference,' (2) 'knew it was material,' and (3) 'made a *deliberate decision* to withhold it.' It is the last requirement that is missing from the record developed in this case." *1st Media*, 694 F.3d at 1377 (emphasis in original). Here, there is insufficient evidence that McGinness believed the prior art was material and that he then made a deliberate decision to withhold it. Being aware of the prior art and *possibly* believing it is material is not enough.

Second, Mitsubishi contends that specific intent is shown circumstantially because the references McGinness is accused of withholding are "more material" than the art that was cited to the Patent Office during prosecution of the '705 Patent. Dkt. 744 at 92. But this argument also assumes that McGinness knew of the undisclosed art and believed it to be material. This was not proven, as previously mentioned. McGinness testified that he disclosed the Janssen reference—GE's then-pending application on low voltage ride through—because it was "a significant patent in my mind because it had been licensed," Vol. 3B Tr. At 22:2-8, "so therefore, I made sure it was cited," *id.* 41:4-16. And the revised '705 application itself informed the PTO examiner that low voltage ride through was known in the prior art. '705 Patent, col. 6:63-67. That McGinness did not disclose other ZVRT art, there is not sufficient proof that he acted with "specific intent to deceive." In short, the Court can infer it, but not by clear and convincing evidence.

Third, Mitsubishi argues that McGinness's failure to "correct his omissions" when the claims of the '705 application were amended in June 2009 is circumstantial evidence of his

specific intent to deceive. Dkt. 744 at 93-94. Yet Mitsubishi's argument assumes a level of involvement by McGinness with the 2009 amendment that the record does not support:

Q: Now, you were also the attorney of record on the June 17, 2009 amendment to the '705 patent; is that right?

A: When the amendment occurred, I was no longer—I didn't participate in that amendment, but I guess technically in the patent office, I'm the attorney of record.

Q: What role did you play in the amendment if you recall?

A: I don't recall the amendment being made. By that time in '09, actually, the year before that, in '08, a lawyer was hired to work underneath my supervision, and his task was to take – manage the preparation, prosecution, of all patent applications for the wind business. So I assigned all that work to the attorney underneath me.

Vol. 3A Tr. at 34:18-35:4. Accordingly, the fact that McGinness did not disclose any additional prior art in connection with the 2009 amendment does not establish a deliberate decision to withhold that art with intent to deceive.

Fourth, Mitsubishi argues that a "pattern of misconduct" is circumstantial evidence of a deliberate decision by McGinness to withhold known material art in connection with the '705 application. The key piece of the alleged pattern is Mitsubishi's allegation that GE improperly included a figure depicting a widely used low voltage ride through curve from the E.ON 2001 standard in the application for GE's '221 patent without attributing the curve to E.ON. GE argues that the '221 patent is not in any way related to the '705 patent. *See* GE Br. 49. Therefore, GE claims that the alleged misconduct during the '221 prosecution cannot serve as the basis for a finding of inequitable conduct here. *See Etypharm S.A. France v. Abbott Labs.*, 748 F.Supp.2d 354, 361 (D. Del. 2010) ("Etypharm's argument amounts to an accusation of unclean hands surrounding the prosecution of the entirety of the Stamm Patents. The Supreme Court, however,

has found that misconduct unrelated to the matter at litigation is not relevant to the demonstration of inequitable conduct during the prosecution of the patent at issue.”) (*citing Keystone Driller Co. v. General Excavator Co.*, 290 U.S. 240, 245 (1933)).

GE contends that “Mitsubishi’s argument regarding the ‘221 application fails in any event, because as established at trial, the attribution of the figure to E.ON in fact *was* before the examiner during the prosecution of the ‘221 patent.” Vol. 5B (Witherspoon) Tr. at 81:6-87:10; DTX-1175 at MHI4019453. GE also argues that the German-language caption was removed from the first English language version of the application that was filed under the Patent Cooperation Treaty *before* McGinness took over supervising the prosecution of the application from another GE attorney, so it does not evidence anything about McGinness’s intent with respect to the ‘705 patent application. Vol. 5B Tr. at 81:4-82:21. The Court finds this evidence persuasive, and as a result, does not find that the exclusion of the E.ON 2001 standard with the ‘221 is indicative of inequitable conduct.

Mitsubishi also faults McGinness’s failure to cite GE’s pending patent application to Weng, which the examiner located and used as the basis for an initial rejection of the claims. But Mitsubishi cites no evidence that McGinness was aware of the Weng reference or believed it to be material. Furthermore, Mitsubishi did not ask McGinness about Weng when he was on the stand at trial. Mitsubishi *has* shown documentation that McGinness authorized the filing of the *Weng* application with the patent office. *See* Mitsubishi Br. 91 (citing DTX-2622 at GENDTX07696708-714). The record shows that the PTO examiner initially rejected the patent application because GE failed to disclose its own Weng patent. (Vol. 5B Tr. 41:8-42:14; DTX-1505 at 75). Nevertheless, Mitsubishi has not proven that McGinness’s involvement with the Weng reference was so significant that he appreciated its materiality. Indeed, this problem is

symptomatic of the larger flaw in Mitsubishi's position: while there is evidence on the record that McGinness had the prior art in his possession, the documentation is insufficient to find clear and convincing evidence that McGinness deliberately deceived the PTO based on the Federal Circuit's *Therasense* standard.

#### **B. Nick Miller**

Similarly, while Nick Miller failed to disclose competitors' material prior art, there is insufficient evidence this was a deliberate effort to deceive the PTO. Miller was in charge of keeping the ZVRT program team and the Grid Interconnect IP team apprised of current industry and regulatory developments. *See* Vol. 5A Tr. 21:21 – 22:25; Vol. 5A Tr. 36:18 – 37:1. Miller was substantively involved with the patent application and admitted that he reviewed the invention disclosure prepared by the inventors of the '705 patent. (Vol. 5A Tr. 23:1 – 24:19).

A key part of Miller's job was to stay abreast of and report on industry developments, giving him familiarity with multiple pieces of prior art. He attended the June 2003 Spain conference where Bolik presented the first Vestas paper disclosing ZVRT. *See* [DTX- 517]; Vol. 5A Tr. 15:7-25. On October 20, 2003, Miller received and forwarded the Saylor's presentation from the Boston conference. *See* DTX- 2297; Vol. 5A Tr. 9:16 – 11:5. The next day, Miller sat on the panel at the October 2003 Denmark conference where Bolik presented her second paper on the Vestas advance and Hartge presented a paper on the Wobben '941 method. *See* DTX- 1202; Vol. 5A Tr. 11:6-20. Then, in January 2004, Miller received and forwarded the October 2003 Bolik paper and presentation. *See* DTX-1741; Vol. 5A Tr. 11:21-12:5. In August and September 2004, Miller received and discussed the Nielsen '936 patent, reflecting a detailed

examination of its contents for possible infringement by GE's own experimental technologies. *See* DTX-1032; Vol. 5A Tr. 16:16-17:13.

Miller was also familiar with Erdman. In September 2005, as a co-inventor on another patent, Miller cited the Erdman '083 application as prior art. *See* DTX-2310; Vol. 5A Tr. 20:4-21. Additionally, Miller's Grid Interconnection Landscaping Team listed in spreadsheets both Wobben '941 and Nielsen '936. *See* DTX-276 (Nielsen '936); DTX-1715 (Wobben '941); DTX-2669 (both). Miller was also custodian of the September 5, 2006 Vestas grid connect spreadsheet. [DTX-2589]. Thus, Miller encountered Erdman, Nielsen and Wobben, as well as Bolik, Saylor and Hartge. Furthermore, at trial Miller testified that he understood at least one of GE's competitors had achieved a "controls-based solution . . . [f]or ZVRT . . . [i]n which the turbine will always remain connected to the grid." Vol. 5A Tr. 14:17-15:5 (App. 276-277); Mitsubishi Br. 56-57. Miller communicated his understanding to key GE players, including '705 co-inventor Einar Larsen. *See* DTX-2297 (emailing that it "[l]ooks like 0% for 200ms on V80").

GE argues that "the evidence at trial showed that Mr. Miller's state of mind at the relevant time frame was that riding through down to 5% *was not* zero voltage ride through." GE Br. 58 (citing PTX-478). Specifically, in 2006 and again in 2008, Mr. Miller wrote emails explaining why Vestas, in his mind, did not have zero voltage ride through, because they were struggling with the last 5%. Vol. 5A Tr. at 51:11-53:2; *see also* PTX-39; PTX-478. In the cited email, Miller says that Vestas' technology "corresponds roughly, but not exactly to our LVRT III" because "they *seem to claim that they can do zero*, but are sketchy on the details." PTX-478 (emphasis added). Yet prior art references are presumed to be enabling. *See In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012) ("In patent prosecution the examiner is entitled to reject application claims as anticipated by a prior art patent without conducting an inquiry into

whether or not that patent is enabled . . . .”). Miller’s subjective belief about whether or not the solution disclosed actually worked, in practice, has no bearing on whether or not the prior art *anticipated* the claims of the ‘705 application. If anything, his subjective belief, even if incorrect, indicates he thought the prior art was *not* material.

Regarding Miller’s presentation, GE points out that he produced results showing GE’s wind turbines riding through voltages down to 30%. Miller testified that he did not believe that to be zero voltage ride through. Vol. 5A Tr. at 56:3-17; *see also* PTX-479.008.20. GE therefore argues that “it stands to reason that he would not have believed that the graphs showing voltage drops down to 30% in the Hartge paper to be indicative of zero voltage ride through either.” GE Br. 59. GE argues this shows Miller did not connect the prior art to the ‘705 patent application. The Court views this as a reasonable inference. *Therasense*, 649 F.3d at 1290-91 (“[W]hen there are multiple reasonable inferences that may be drawn, intent to deceive cannot be found.”).

GE also contends that Mitsubishi places undue weight on the fact that Miller sent or received emails attaching the prior art, arguing these are insufficient as a matter of law to show specific intent to deceive in connection with the application for the ‘705 Patent. *See 1st Media*, 694 F.3d at 1374. Indeed, if the emails were mere attachments of the patents in nothing more, Miller’s explanation would be plausible. Yet he wrote “they seem to claim they can do zero” when evaluating the Vestas patent. The fact is, the Vestas technology *claimed it could* ride through zero voltage events at the point of interconnection, and that created a duty to disclose it to the Patent Office. Yet there is insufficient evidence that Miller connected the Vestas prior art to the ‘705 application, or that he deliberately withheld it.

Miller likely understood the turbines at Colorado Green were able to perform ZVRT, but it is not clear his failure to include this material with the ‘705 patent application was part of an

effort to deceive the PTO. Certainly, he wrote to GE's potential customer an assurance that "[t]he GE 1.5 megawatt machine equipped to satisfy the Australia NEC code requiring operation through extremely low (zero voltages) will continue operation down to zero voltage without tripping from the grid." DTX-2814; Vol. 5A Tr. 33:6-13; *see also* DTX-1995 (Miller received emails from Larsen and his boss Art Romano confirming the capability of the GEIS converter to achieve ZVRT). Miller later displayed the capabilities of the Colorado Green turbines in a technical paper that he admitted at trial included a simulation demonstrating ZVRT. Vol. 5A Tr. 8:25 – 9:3; DTX-1630. The paper confirmed that the simulation was "sufficiently representative of the detailed wind farm system." *Id.* At GENDTX00408387. GE argues that Miller had knowledge that the GE turbines had a setting that required them to trip at grid voltage below 5 percent, and further GE argues that "the paper simply used Colorado Green as a starting point for the offshore wind farm computer model, and did not reflect the actual capabilities of the wind turbines at Colorado Green." GE Br. 58 19 Vol. 5A Tr. at 37:19-38:17. GE Br. 59.

### **C. Einar Larsen**

There is insufficient evidence that Einar Larsen sought to deceive the PTO. Larsen was a co-inventor of the '705 patent, which makes him responsible for full candor under PTO Rule 56. 37 CFR § 1.56; *see also* (Vol. 4 Tr. 3:11 – 13). Additionally, Larsen submitted a declaration to the PTO that he was an "original, first and sole inventor" of the subject matter claimed in the '705 patent in which he acknowledged his "duty to disclose information which is material to the examination of this application in accordance with 37 CFR § 1.56." (DTX-1505 at 35, 39). Larsen had a key role in developing and testing the GEIS (GE Industrial Systems) converter capable of providing ZVRT for commercial wind turbines. (Vol. 4 Tr. 4:14 – 6:19). Larsen was also a member of the ZVRT program team and drafted the document entitled "Converter Control



Concepts to Meet Severe Wind Requirement with GE 1.5 Generator,” which was provided to outside counsel as a basis for the '705 application. *See* Vol. 4 Tr. 24:19-22; DTX-2629; DTX-1315.

Mitsubishi does not accuse Einar Larsen of having knowledge of Erdman, Wobben '941, or Hartge. Dkt. 744 at 56-63. Furthermore, with respect to the Vestas Prior Art, Mitsubishi's only document connecting that prior art to Larsen is a single email in October 2003 (DTX-2297) from Nick Miller that attached the Saylor's Presentation. Dkt. 744 at 64. At trial, Larsen was never questioned by Mitsubishi about the Saylor's Presentation or any other Vestas prior art, nor is there any evidence showing that Larsen actually reviewed the Saylor's Presentation.

At trial, Mitsubishi showed that Larsen was a key player in the 2003 ZVRT tests. The day before the test Larsen directed the GE team to “include the worst possible faults” and further advised that they should “be as low as you can go – if you can claim zero voltage at high side of padmount transformer then you will be untouchable.” DTX 1579; Vol. 4 Tr. 5:7 – 6:16. Larsen understood that the test converter was the design “deployed across all the turbines” including in those at Colorado Green and Sweetwater. Vol. 4: 16:6 – 17:1. GE argues that Larsen did not disclose these prior uses because the software, “Parameter 20.19”, was set to 5 percent in the field. Larsen testified at trial that GE's turbines would still see voltage of at least 5 percent for zero voltage faults outside of the turbine because of impedance. Vol. 4 Tr. 20:11-25; 30:10-21.

Yet during GE's own certification of its turbines, the measurement inside the turbine recorded at least 5 percent voltage when the fault was applied on the high side of padmount transformer where bus 242 would be. PTX-6 at 152, Diagram 3.26.1.1 (showing the measurement going down no lower than 5 percent without even including a 0 on the y-axis). Larsen's own “Converter Control Concepts” document further supports this principle. DTX-

2684 at 15 (showing impedance of 5 percent at the padmount transformer). Finally, in September 2003, Frame, Miller and Larsen considered whether using GEIS converters would expose GE to any risk of failing to meet the interconnection requirements for Colorado Green. *See* DTX-1573. The analysis found that the GEIS converter would meet the interconnection requirements and expressly noted that “[c]onverter/generator ride through with voltage drops as low as zero volts at grid side of padmount transformer have been tested with continuous operations.” *Id.* at 5.

Larsen testified that the wind turbines at Colorado Green and Sweetwater were configured to disconnect if the grid voltage at the turbine dropped below 5% and did not have zero voltage ride through. Vol. 4 Tr. at 83:9-84:3. Mitsubishi contends that the claims of the ‘705 patent are satisfied if the wind turbine rides through a fault during which the grid voltage is low at the turbine so long as it is zero somewhere on the power grid. Larsen testified to the Court that his invention was about zero volts at the turbine and that the ‘705 Patent and therefore he believed GE’s accomplishments with its GEIS technology were not relevant prior art. Vol. 4 Tr. at 70:7-71:10. The Court concurs with Mitsubishi’s point that, regardless of settings, the turbines at Colorado Green and Sweetwater were capable of ZVRT, but there is insufficient evidence that Larsen believed that capability was relevant to the ‘705 patent. Indeed, his state of mind appears to have been that the 5% setting made the GEIS converters an LVRT technology, and because of that, there is insufficient evidence of an effort to deceive the PTO.

With respect to Cowboy Wind, there is an absence of evidence that Larsen was aware of those wind turbines, that he believed they included a PLL state machine and were relevant to claims 9 and 13 of the ‘705 Patent, or that he made a deliberate decision not to disclose those wind turbines. The only individual that Mitsubishi questioned about the PLL included in the

wind turbines at Cowboy Wind was Sidney Barker, and Mr. Barker testified that he did not believe those wind turbines included a PLL state machine. Vol. 3B Tr. at 96:25-97:6.

#### **D. Scott Frame**

Mitsubishi has not established by clear and convincing evidence that Frame committed inequitable conduct in connection with the preparation or prosecution of the '705 Patent. Frame certainly encountered both the prior art and GE's own prior uses of the turbine technology. Frame was a leader of the June 2003 ZVRT testing project and, in that position would have been in a position to receive all reports from ZVRT co-member Miller. Frame admitted to being the 'liaison' between the inventors of the '705 patent and the patent attorneys. (Vol. 5A Tr. 69:15-23). Frame also expressly admitted that he "participate[d] in the discussion" at meetings as well as the actual "preparation" of the '705 patent application. (Vol. 5A Tr. 69:24 – 70:4). For example, Frame set up and participated in a meeting with Larsen on the "key question" of the "scope of claims" for the '705 patent just one month before the application was filed. *See* DTX-1778; Vol. 5A Tr. 91:7 – 92:8.

He also circulated the report on the June 2003 Salem ZVRT tests. (DTX-1218). He then "released [the] 1.5 megawatt GEIS converter to GE Wind production and successfully commissioned [it] to customer sites" including Colorado Green and Sweetwater. *See* DTX-2825; Vol. 5A Tr. 65:3 – 11. In August and September 2004, Frame also received Nielsen '936. (DTX-1032). From at least June 2006 to October 2006, Frame worked on the Grid Interconnect IP team to identify key competitor prior art listed in spreadsheets that included Wobben '941 and Nielsen '936. *See* DTX-276 (Nielsen '936); DTX-1715 (Wobben '941); DTX-2669. Frame received yet another copy of Nielsen on February 20, 2008, with the duty of candor still in full effect. [DTX-

2527]. Thus, Frame demonstrably knew about at least two references, plus GE's technology, though Mitsubishi did not provide clear and convincing evidence that he considered it material to the '705 patent application.

GE's suggests Frame's failure to disclose the prior art and public uses is because "it doesn't take much" for the discussion of ZVRT to "surpass his technical capability." GE Br. 57. The Court finds it unusual that GE would suggest that one of its top engineers, who oversaw the testing and then production of millions of dollars of converter equipment, did not have had sufficient capacity to understand ride through technology of GE and its competitors. That said, GE astutely points out that Mitsubishi did not prove that Frame ever *reviewed* any of the prior art publications, much less that he understood them and believed them to be material to patentability of any claim of the '705 Patent. Mitsubishi points only to the fact that Frame had custody of a spreadsheet (DTX-2669) over 100 pages in length listing Nielsen and Wobben '941 among dozens of other patents and published patent applications. But Frame testified that "I do not believe I read through it, and I may not have even opened it." Vol. 5B Tr. at 16:7-10. When asked whether he pulled the patents and applications listed in the document to review them, Frame responded "I am sure that I did not." Vol. 5B Tr. at 16:11-14. Frame explained that the document was sent to him as an example because he was being asked to set up a meeting to create a similar document for converter controls patents. Vol. 5B Tr. at 16:15-22.

GE also argues that Frame did not believe earlier uses of the GEIS converter were sufficient to implicate the claims of the '705 patent. In May 2004, in response to a customer request for ride-through specifications of GE's turbines, Frame told George Wakileh, a GE sales person, that GE's 1.5MW wind turbines were not capable of meeting the ZVRT requirements, even for the 150 milliseconds shown in the E.ON 2003 grid code. PTX-505; Vol. 3A Tr. at 8:18-

9:16. Frame also testified that the 2003 Accuwave test did not demonstrate ZVRT capability because the test was run only at full load, and Frame's team "still needed to continue to develop the control capability so that we could ensure that we would be able to ride through zero voltage under different operating conditions for various lengths of times, including shorter times. And specifically, one of the challenges was making sure that we could reliably recover when the grid came back." Vol. 5B Tr. at 13:20-14:12.

The emails on which GE relies do not suggest that GE's turbines were not *capable* of meeting the ZVRT requirements. Instead, they merely demonstrate that, as of 2004, GE Wind was not yet guaranteeing the effectiveness of the technology in its contracts. See PTX-505 ("Zero voltage is an additional option that is being developed per request of the PPB. Zero voltage ride through will not be available for FP&L in 2004.") Indeed, there was no need for such guarantee in 2004 for GE's US customers because ZVRT was not yet an official FERC requirement. The first of GE's US projects that actually *required* "ZVRT" was Kaheawa Pastures. DTX-2155. Furthermore, Frame testified that the GE turbines installed at Colorado Green and Sweetwater were specifically configured to trip offline if the voltage at the turbine fell below 5%. Vol. 5B Tr. at 14:13-15:13. While the sworn testimony of Stan Tehee, admitted after trial, raised questions about whether the turbines were configured to trip offline, the Court finds reasonable the explanation that Frame did not believe GE's previous turbines were relevant ZVRT technology that needed to be included in the '705 patent application.

#### **E. Bob Delmerico**

While the Court finds that Robert Delmerico did not deliberately deceive the PTO according to the Federal Circuit's "clear and convincing" standard, his deposition testimony

often contradicted the evidentiary record. Because his lapses of memory were so extensive, the Court viewed his testimony as the least helpful of any witness during the trial.

Delmerico was a member of both the ZVRT Program team and the Grid Interconnect IP team. The flaws in Delmerico's testimony became particularly critical when he claimed that "he was not involved in the design effort to develop zero voltage ride through capability [for] GE" or that "he had no discussions about intellectual property with respect to zero voltage ride through." GE Br. 62. In fact, Delmerico's name appears in 350 entries on GE's privilege log, 163 of which involved Jim McGinness and 14 of which involved outside counsel at Armstrong Teasdale. GE Br. 61 (Dkt. 744 at 14). GE spends extensive time instructing the Court not to draw a negative inference about the substance of the communications. GE Br. 63. *See Parker v. Prudential Ins. Co. of America*, 900 F.2d 772, 775 (4th Cir. 1990) (district court impermissibly drew inference about the substance of privileged communications merely from the fact that they had occurred); *THK Am. v. NSK, Ltd.*, 917 F.Supp. 563, 566-67 (N.D. Ill. 1996) ("Disallowing adverse inferences is a logical extension of the attorney-client privilege since allowing a negative inference would in many cases oblige the client to produce the privileged materials."). While the Court will not draw a negative inference from Delmerico's inclusion in those communications, his participation belies his memory failures regarding the '705 patent application process.

Additionally, as Frame's technical right hand, Delmerico clearly encountered many prior art references. In January 2004, Delmerico received the October 2003 Bolik paper and presentation. *See* DTX-1741; *see also* [DTX 2622] (Bolik June 2003 paper found in Delmerico possession). In August and September 2004, Delmerico received Nielsen '936 and discussed its possible pre-emption of the ZVRT techniques GE was developing. (DTX-1032). In July 2005, Delmerico reviewed Wobben '941 and found it to be "relevant and of concern." (DTX-1960)

(App. 982). Delmerico also received a copy of Erdman '083. *See* [DTX-2020 found in Delmerico possession] (App. 992-1004).

When viewed in the context of Delmerico's claimed non-involvement on the ZVRT Program and Grid Interconnect IP teams, the documents appear to contradict his testimony. GE does not dispute that Delmerico identified Wobben '941 as "relevant and of concern" in a July 2005 email that of his periodic "items of interest" that would be circulated to GE Wind management and other engineers. DTX-1960. GE's brief relies upon McGinness' testimony that Delmerico's comment was in relation to a concern about GE's own products. *See* GE Br. 64. Yet paradoxically, GE also says that McGinness was *not* a recipient of this Delmerico email and that no one ever raised this concern to him. *See* GE Br. 45 n.14. GE fails to explain this obvious inconsistency.

Delmerico, as a member of the IP Grid Interconnect team with McGinness, also encountered the Erdman '083 application around this time. *See* Vol. 5A Tr. 20:4 – 21; DTX-2310. Yet his knowledge of Erdman does not prove he considered it *material* to the '705 patent. Additionally, in connection with his role on the Grid Interconnect IP team, Delmerico again encountered Wobben '941 in the months leading up to the '705 patent application. *See* DTX-2521; Vol. 3A Tr. 111:9 – 114:19. By July 2006, the Grid Interconnect IP team was holding weekly meetings to review competitor patents and patent applications related to grid connect technology such as LVRT and ZVRT. *See* DTX-1904; Vol. 3A Tr. 117:12 – 118:16.

GE argues that "Mitsubishi adduced no evidence whatsoever that Delmerico ever even read four of the six prior art publications on which Mitsubishi's inequitable-conduct claim is based, much less identified them as material to the '705 application." GE Br. 62. Nevertheless, GE does admit that Delmerico did review some portion of the German-language Wobben '941

publication and described it and two other references as being “relevant and of concern” in a July 2005 email to James Lyons and Rebecca Voelker at GE’s Global Research Center. But McGinness testified that Delmerico’s comment was “in relation to people trying to determine [if there are] patents of concern to GE’s own products.” Vol. 3A Tr. at 107:17-23. Delmerico also reviewed some portion of Nielsen in September 2004 and concluded that it did not disclose “an approach that we have considered, so I don’t see it as an issue.” DTX-1032. Delmerico was not asked about his September 2004 or July 2005 emails, the Nielsen or Wobben ‘941 references, or any of the other prior art references now at issue in this case at his deposition, and Mitsubishi did not ask GE to bring him to testify live at trial. The record is thus devoid of any evidence suggesting that Delmerico ever believed Wobben ‘941, Nielsen or any other prior art reference to be material to the ‘705 patent application.

Lastly, the Court wishes to address GE’s argument that Delmerico was not a person within the scope of rule 56 for the purposes of the ‘705 Patent. The Federal Circuit holds that “substantive involvement” means “that the involvement relates to the content of the application or decisions related thereto, and that the involvement is not wholly administrative or secretarial in nature.” *Avid Identification Sys., Inc. v. The Crystal Import Corp.*, 603 F.3d 967, 974 (Fed. Cir. 2010) (president of Avid was “substantively involved” because he was “involved in all aspects of the company’s operation, from marketing and sales to research and development.”). GE’s argues that Delmerico was not substantively involved with the ‘705 application. Yet the Court is unconvinced by GE’s explanation of Delmerico’s role. As previously mentioned, there is the email in which Scott Frame stated that “Bob Delmerico and I can help push stuff through the application process,” and secondly, the fact that Delmerico’s name appears in 350 entries on GE’s privilege log, 163 of which involved Jim McGinness and 14 of which involved outside



counsel at Armstrong Teasdale. Dkt. 744 at 14. With regard to the email, Scott Frame testified at trial that by “pushing stuff through the application process,” he was referring to “getting the right people’s attention to move [invention disclosures] forward to the next level of approval. So basically facilitating the process.” Vol. 3A at 103:1-11. This clearly appears to be direct involvement. Even so, Delmerico’s direct involvement does not sufficiently show he considered the prior art material, or that he deliberately deceiving the PTO.

### IX. Conclusion

While the Court has found the prior art and prior uses to be material, there is insufficient evidence that GE fully appreciated the materiality and made a deliberate effort to withhold it from the PTO. Despite the limitations imposed during discovery, Mitsubishi presented compelling evidence that the five key GE players *encountered* the prior art and *considered* its materiality, but alone that is not enough. Certainly, *Therasense* reaffirms that direct evidence is rare and that circumstantial evidence is the ordinary means of proving intent. *See Therasense*, 649 F.3d at 1290 (Fed. Cir. 2011) (en banc) (“Because direct evidence of deceptive intent is rare, a district court may infer intent from indirect and circumstantial evidence.”). Yet without more, the Court cannot find clear and convincing evidence of a plot to deceive the PTO, given the Federal Circuit’s extraordinarily high standards outlined in *Therasense* and *1<sup>st</sup> Media*. Additionally, GE’s extensive use of the attorney-client privilege prevented a more thorough examination of the documentary record, so the Court is left only with the evidence before it. Finally, the PTO’s recent Right of Appeal Notice, finding that Erdman, Nielsen and Wobben are *not* material shows that reasonable minds at GE could have held the same beliefs during the ‘705

application process. As a result, the Court cannot make a finding of inequitable conduct, and rules for Plaintiff General Electric.

IT IS SO ORDERED.

Signed this 28<sup>th</sup> day of May, 2013.

A handwritten signature in black ink, reading "Royal Furgeson", written over a horizontal line.

Royal Furgeson

United States Senior District Judge